TNRCC

Protecting Texas
by Reducing and
Preventing Pollution

Preliminary Assessment/ Screening Site Inspection Work Plan

for

Trinity Valley Iron and Steel Company
TXD980626048
Fort Worth, Tarrant County, Texas

Prepared in cooperation with the
U.S. Environmental Protection Agency

April 1997

SCREENING SITE INSPECTION WORK PLAN

Trinity Valley Iron and Steel Site

Fort Worth, Texas

TXD980626048

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Screening Site Inspection Work Plan

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Texas Natural Resource Conservation Commission
and
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Prepared by

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Emergency Response and Assessment Section
Site Discovery and Assessment Program Staff
Austin, Texas

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CONTENTS

FIGURES

TABLES

NOTE

The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

SECTION 1

INTRODUCTION

The Texas Natural Resource Conservation Commission (TNRCC) has been requested by the U.S. Environmental Protection Agency (EPA) Region VI to conduct a Screening Site Inspection (SSI) at the Trinity Valley Iron & Steel Company (TVI) site (EPA Identification number TXD980626048). The TVI facility operated as a grey iron and ductile iron foundary from 1924 until the company discontinued operations in 1988. The facility produced water main fittings. As part of the foundry processes, waste sand (foundry sand), slag, metal grindings, and lead and cadmium contining furnace emissions were produced. (Reference 3).

The purpose of this work plan is to describe the site reconnaissance and sampling activities which are planned at the site to determine if further action is required as described below.

WORK PLAN OVERVIEW

The purpose of the SSI is to document the release(s) or potential release(s) of hazardous substances from identifiable sources which may have migrated off-site. This work plan was developed using available information obtained through a review of TNRCC central files located in Austin, Texas, and a review of the PR/VSI Report conducted by A.T.Kearney, Inc. in August 1987. The information collected from the review of records was evaluated for data gaps and additional information needs were incorporated into the work plan. This plan will be modified as necessary based on actual site conditions encountered.

Section 1 is the introduction. Section 2 is the site background and description, and Section 3 describes the site field work to be conducted. The PA narrative, water well logs and information, site specific Health and Safety Plan, TNRCC FY97 Quality Assurance/Quality Control (QA/QC) Requirements document, and the Site Reconnaissance Checklist are presented as appendices A through E, respectively.

SITE OBJECTIVE WITH RESPECT TO THE PREREMEDIAL PROCESS

The preremedial stage of the Superfund process involves a PA and a site inspection (SI) stage consisting of an SSI and, if necessary, a listing site inspection (LSI). This SSI is being conducted to determine if the above-referenced site is eligible for proposal to the National Priorities List (NPL) under the Federal Superfund Program. The SSI will focus on assessing the threat along the surface water, and soil exposure pathways within the site.

This SSI will build upon existing data by obtaining additional background information relevant to the site through a file review and collecting environmental samples to further characterize conditions at the site. Sampling conducted during the field work will attempt to document hazardous substance migration to and from the site from potential sources, and look for evidence of actual human and environmental exposure to contaminants.

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SECTION 2

SITE BACKGROUND AND DESCRIPTION

SITE INFORMATION

The TVI site is located in Tarrant County at 3400 Bryce, Fort Worth, Texas (Figure 1). The inactive site, still owned by McWayne,Inc., occupies approximately 16 acres of in the vicinity of University Drive and Bryce Avenue. The site is located at approximately 32^0 44' 20'' north latitude and 97^0 22' 10'' west latitude. The Fort Worth Botanical Gardens borders the property to the east. Sometime after 1990 (exact time unknown) the owners of the facility removed all physical structures and buildings of the facility and began leasing the property to the Southwestern Exposition and Livestock Show for automobile parking.

TVI operated a grey iron foundry from 1924 until 1988. The site, covering approximately 15 acres, is inactive. The foundries process would remelt scrap metals in a cupola furnace to produce new cast iron products (Reference 3). Until 1984, slag was drawn off the top of the molten metal and drummed. After 1977, emissions from the cupola furnace were fed to a baghouse. The ash or dust from the baghouse was removed for disposal on-site in a landfill. The landfill was closed in accordance with an TNRCC approved closure plan in 1986, with TNRCC closure acceptance being granted for the closure on December 16, 1988 (Reference 4 & 5).

While in operation the facility utilized drums filled with foundry waste (slag and shot-blasts fines) as bulkheading for fill material. The fill material consisted of foundry sand and shot-blast fines. This construction method was utilized to build up the eastern and southern portions of the property. The drums are stacked seven layers high (approximately 21 feet) and two and three rows deep. The approximate total linear feet of the drum/foundry waste wall structure is 2,467 feet. An exact estimate of the slag, shot-blast fines, and foundry for sands is unknown. Findings during a November 1987 Sampling Visit Report conducted by A. T. Kearney, Inc., for the EPA indicated that the shot-blast fines and foundry sands contain concentrations of napthalene, xylene, and phenols (Reference 3). Following a site visit by TNRCC personnel on October 16, 1996, the pathway of concern is the surface water pathway by human food chain target (fishery) on the Clear Fork Trinity River.

TNRCC

Trinity Valley Iron

Fort Worth, Texas

EPA ID# 980626048

Figure 1

Site Location Map

WASTE CONTAINMENT/HAZARDOUS SUBSTANCE IDENTIFICATION

Characteristics

The information used to identify the waste characteristics at the TVI site was obtained from a review of the Sampling Visit Report and reports which have been submitted to the TNRCC. During site operations, there were various Solid Waste Management Units (SWMUs) that were used to dispose/handle process wastes. In 1988 the facility stopped operations and soon dismantled and removed all structures of the facility. Following the site reconnaissance conducted by TNRCC in October 1996 the main area of concern was recorded at the property. This "area of concern" is;

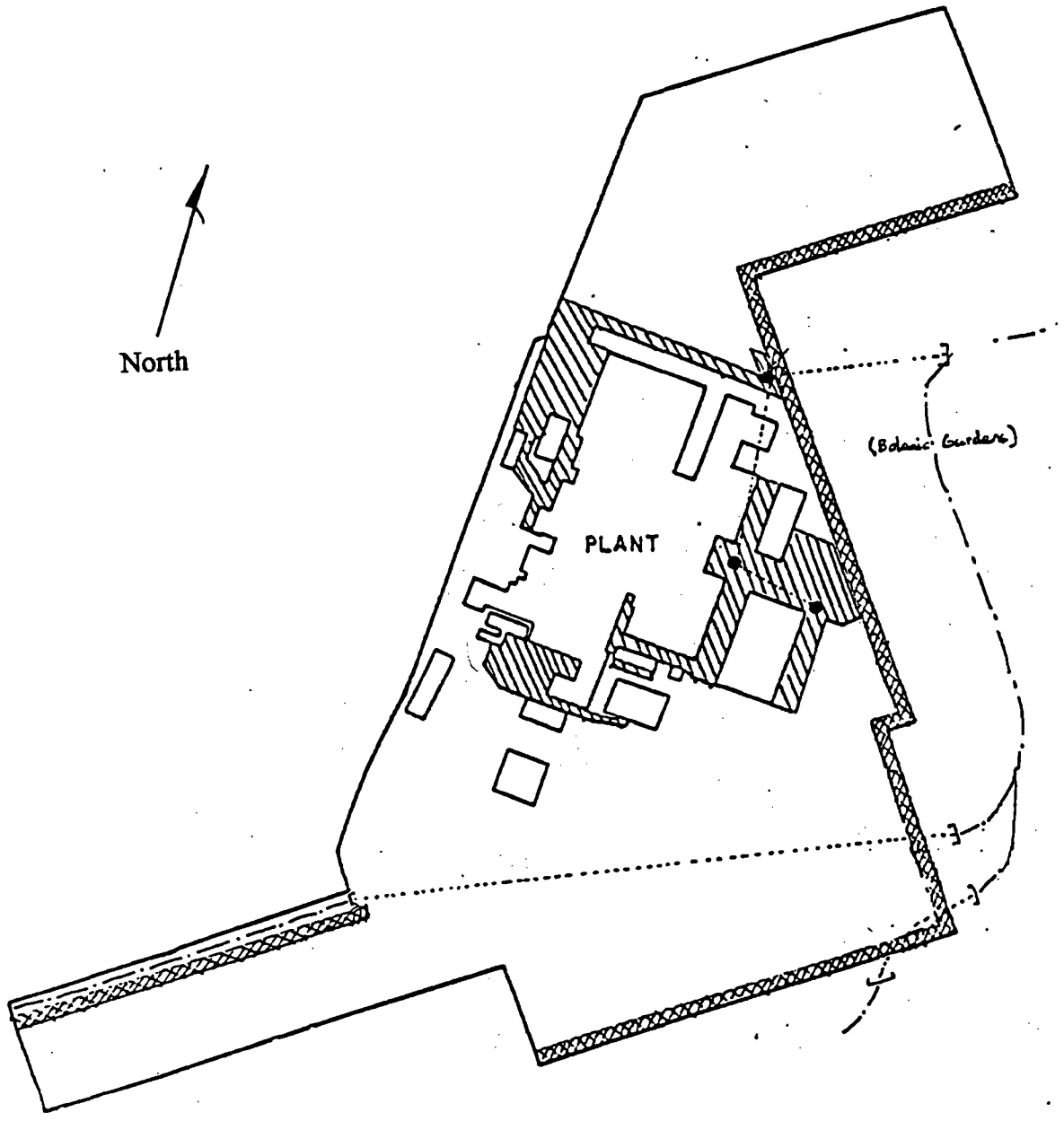
> Retaining Wall/Fill Area (slag,shot blast fines,foundry sand) - Throughout the operational lifetime of the facility the southeast portions of the property was backfilled over twenty-feet. A retaining wall was constructed with 55-gallon drums filled with foundry wastes including slag, shot blast fines, and foundry sands (Reference 3). The area behind the retaining wall was filled with foundry sands up to grade with the rest of the facility. The approximate total linear feet of the drum/foundry waste wall structure is 2,467 feet. An exact estimate of the slag, shot-blast fines, and foundry form sands is unknown. The spent foundry sand presents a potential source of phenol contamination in soils. Analysis of spent sand has shown levels of phenols at 101.5 ppm (Reference 3,pp.44).

The constituents of concern at the TVI site consist of the following five hazardous constituents (Reference 3):

- Phenols;
- Selenium;
- Antimony; and
- Lead.

Required Information (Data Gaps)

- Field verify the site features and locations as depicted in Figure 2.
- Obtain soil samples from the retaining wall/fill area on-site to characterize waste sources.



Not To Scale

Note: Plant Structures Removed in 1990

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Trinity Valley Iron

Fort Worth, Texas

EPA ID# 980626048

Figure 2

Site Features Map

GROUNDWATER PATHWAY AND TARGETS

Characteristics

The TVI facility is located on the Grand Prairie of the Gulf Coast Physiographic Province. The lithologic units which comprise the surficial geology of Tarrant County consist of Quaternary alluvium,and Cretaceous limestones, clays, and sands which dip eastward (Ref. 13).

The aquifers of Tarrant County are comprised of stratigraphic units of the Cretaceous age Trinity Group. The Trinity Group has a maximum thickness in Tarrant County of 1,070 feet and includes, in ascending order, the Travis Peak formation, the Glen Rose limestone, and the Paluxy sand. The sands of the Trinity Group are the most important sources of ground water in Tarrant County. The Travis Peak formation is the most productive aquifer in the county with the Paluxy sand second in importance (Ref.13). The Cretaceous rocks lie unconformably on the strata of the Pennsylvanian series. Below the Cretaceous-Pennsylvanian contact, no water of good quality has been found (Ref. 14)

Based upon information for water wells within a 4-mile radius of the site, depth to usable ground water ranges from approximately 280 to 790 feet below ground surface (Ref.15).

Targets

A file review has not indicated that drinking water wells in the vicinity of the site have been contaminated by hazardous substances from the site. No documentation was found which to support off-site migration of hazardous substances from on-site sources. In addition, no information was found which documented any adverse health effects reported as a result from migration of hazardous substances to subsurface drinking water from on -site sources.

No wellhead protection areas (WPA) are known to have been established within a 4-mile radius of the Trinity Valley Iron facility (Ref. 8).

During the TNRCC site visit in October 1996, all wells located within 1 mile of the site have been abandoned (Ref. 16). No active public water supply wells are located within 4 miles of the TVI facility (Ref.15,16,17).

The surrounding communities within a 4-mile radius of the TVI facility are located within Fort Worth city limits. Drinking water for the Fort Worth facility is supplied by surface water obtained from the lakes along the Trinity River including; Lake Worth, Eagle Mountain, and Cedar Creek (Ref.17).

Public supply, irrigation, industrial and domestic water wells have been identified within a 4-mile radius of the site using State of Texas water well logs, TNRCC public supply maps, and wells identified during the October 1996 site visit. Wells listed as "domestic" on State of Texas water well logs were assumed to be domestic drinking water wells unless otherwise noted. The ground water target populations for domestic water wells were calculated assuming 2.6 persons per

household for Tarrant County (Ref.18). Based upon this information, the following numbers of wells and populations served were defined:

- Within 0 - 0.25 miles of the site, there are no wells identified. Total population served 0.
- Within 0.25 - 0.50 miles of the site, there are no wells identified. Total population served 0.
- Within 0.50 - 1 miles of the site, there were two industrial wells and one domestic well identified. These wells were confirmed plugged during the October 16, 1996 site visit. Total population served 2.6.
- Within 1 - 2 miles of the site, there were seven industrial wells, two domestic, and one irrigation wells identified. Total population served 5.2.
- Within 2 - 3 miles of the site, there were 14 industrial wells, six domestic, one public supply well, and five irrigation wells identified. Total population served 115.6 (Ref.19).
- Within 3 - 4 miles of the site, eight industrial wells, three domestic, no public supply, and two irrigation well identified. Total population served 7.8.

All logs of wells located within 1 mile radius of the site are included as Appendix A.

Required Information (Data Gaps)

- Field verification of existing well locations within 1 mile of the site. Verify by inspection and personnel interviews whether the wells are in use and the number of people served.

SURFACE WATER PATHWAY AND TARGETS

Characteristics

Surface runoff from the TVI facility drains into segment 0829 of the Clear Fork Trinity River within the Trinity River Basin (Ref.20). The total basin area of the Trinity River Basin I 17,969 square miles. Clear Fork Trinity along segment 0829 has a surface length of 14 miles and has a designated water uses of contact recreation, high quality aquatic habitat, and public water supply (Ref.20).

The nearest gaging station located on the Clear Fork Trinity River is the Clear Fork Trinity River At Forth Worth Station #080447500. The annual mean flow of the Clear Fork Trinity River is 149 cubic feet per second (cfs) at station #080447500 (Ref.20).

The TVI facility is not located within the 100 or 500 year floodplain (Ref. 21).

The 2-year, 24-hour rainfall event in the area of the site is estimated at 4 inches with an average annual rainfall of approximately 32 inches (Ref.22).

Targets

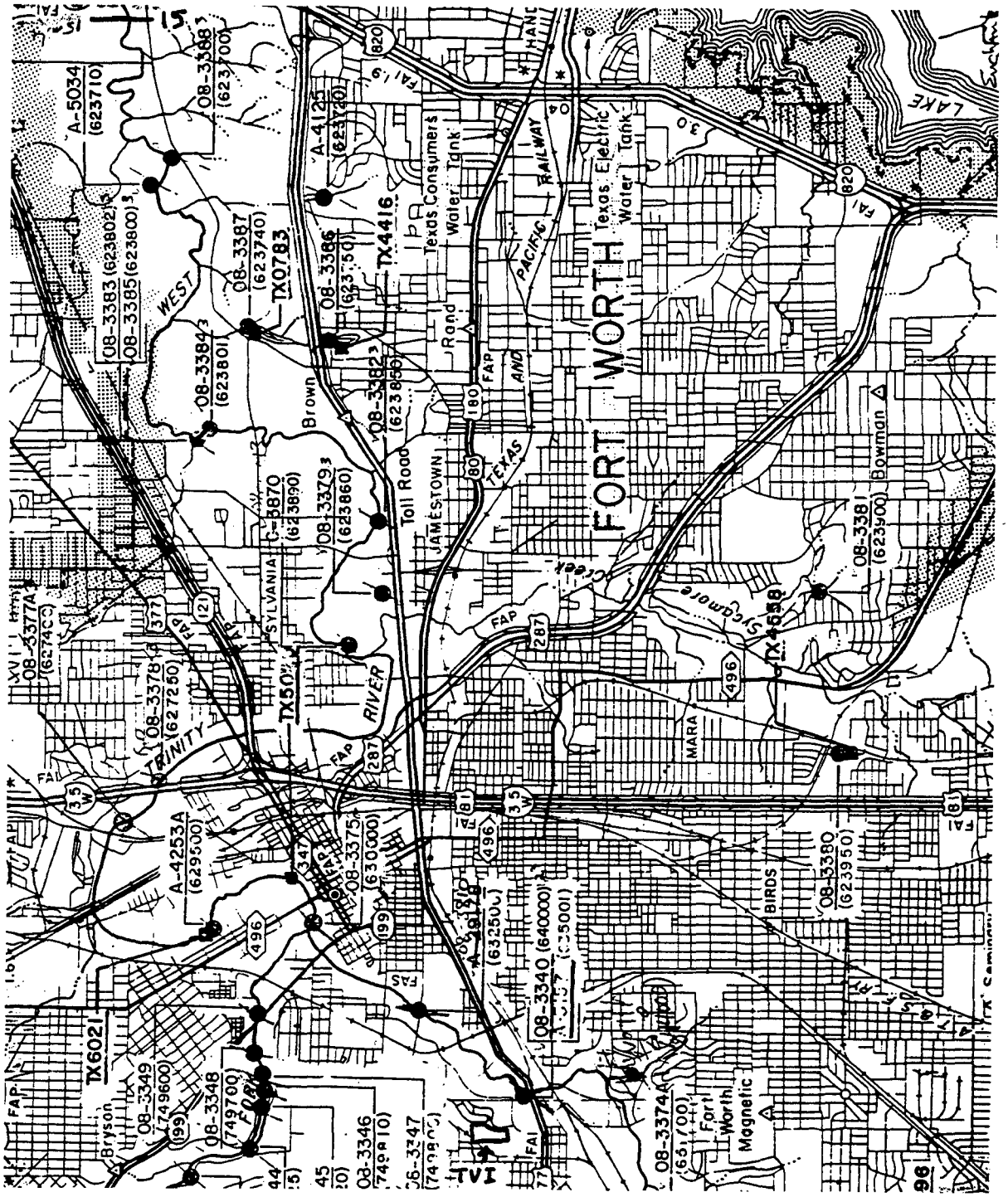
The TVI facility is approximately 20 acres located just west and directly adjacent to the Fort Worth Botanical Gardens. The surface is relatively flat with a gentle sloping to the south southeast. Surface runoff from the facility drains into a seasonal creek located immediately to the east of the facility. The seasonal creek runs southeastward through the botanical gardens for approximately 0.75 miles where it then drains into the Clear Fork Trinity. The Clear Fork Trinity River is considered to be the nearest perennial surface water body to the TVI facility. The junction of the seasonal creek and the Clear Fork Trinity is identified as the Probable Point of Entry (PPE) form the TVI facility.

Figure 3 details the surface water pathway from the intersection of the drainage ditch and the Clear Fork Trinity (PPE) to the end of the 15-mile surface water target distance limit (TDL) that extends along the Clear Fork Trinity River. During the October 16, 1996 site visit a fishery was documented at the PPE by visual observation of a individual fishing. No known fish kills have been documented in segment 0829 of the Trinity River Basin (Ref.20).

There are six know surface water intakes located along the 15 mile in-water segment TDL. All of these intakes are listed as irrigation use withdrawal points (Ref. 23). The nearest intake is located approximately 1 mile downstream of the PPE (Ref.23).

The existence of wetlands within include riverine within 4 miles of the site and along the 15 mile in-water segment TDL (Ref.24).

A search of the Texas Biological and Conservation Data System (BCD) indicated that no known endangered species exist or known to occur within the 4-mile target distance limit (Ref.7).



Trinity Valley Iron

Fort Worth, Texas

EPA ID# 980626048

Figure 3

Surface Water Pathway

Required Information (Data Gaps)

- Field verification to determine the location of drainage channels and drainage patterns in relation to the contaminant sources.
- Field verification to determine fish production (fishing) from first perennial stream.
- Collect sample data to substantiate whether any contaminants have migrated from the site and along the overland migration pathway.
- Field verification that there are no additional sensitive environments, wetlands, or endangered species within a 4-mile radius of the site or from the PPE to a distance of 15 miles downstream.
- Obtain background sediment samples to determine the naturally occurring levels of contaminants in unaffected sediments in the vicinity of the site.

SOIL EXPOSURE PATHWAY AND TARGETS

Characteristics

All structures at the inactive facility were removed in 1990 by the owners, McWayne, Inc.. The area is dominantly paved with areas of cement foundations. The area is fenced on the north, and west sides of the property. The unfenced eastern and souther portions of the property is bordered by the Fort Worth botanical gardens. The facility area is periodically used as a parking area for the Southwestern Exposition and Livestock Show facility located to the north of the facility. Surrounding land use is commercial.

The TVI facility is located on a generally level area with a mild sloping to the south and east towards the botanical gardens. The facility area is defined by urban land consisting of areas that are 85 to 100 percent works and structures, such as office buildings, hotels, railroad yards, airports,streets, sidewalks, and paved parking areas (Ref. 25). Areas not included in the urban land class is covered by fill material that have been altered and obscured to the extent that they can not be classified (Ref. 25). Rainfall runoff in these areas reaches major drains rapidly.

The offsite runoff pattern is to the east and southeast into a seasonal creek that transects the Fort Worth Botanical Gardens. The seasonal creek then empties into the Clear Fork Trinity River.

Targets

There are no schools, day care centers, or residents within 200 feet of the site (Ref. 16).

There are no employees on the property. However, as stated earlier the facility area is

periodically used as parking areas for a local public recreation area (Ref. 16).

There are no wetlands within 4 miles of the site (Reference 24).

There are no Endangered Species or Sensitive Environments for the area (Reference 7). However, the Fort Worth Botanical Gardens (terrestrial sensitive environment) is located immediately to the east of the facility and receives offsite surface water runoff via a seasonal creek transacting the gardens.

Required Information (Data Gaps)

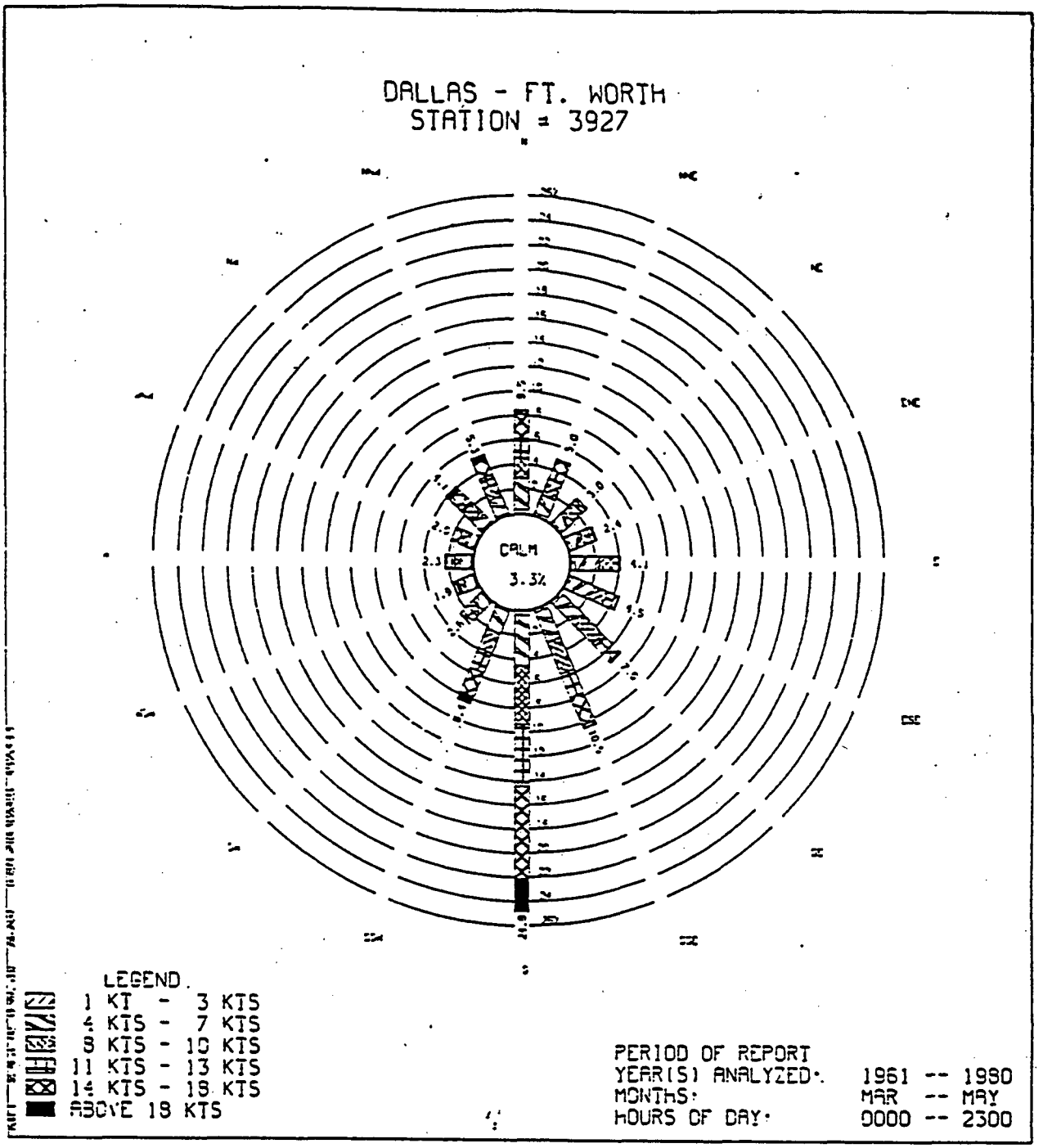
- Field verification of drainage patterns and soil exposure pathways surrounding the site.
- Verification of the distance to the nearest residence and number of occupants.
- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site. Establish the location of the identified sensitive environments through correspondence or field verification.

AIR PATHWAY AND TARGETS

Characteristics

There are no records of air monitoring conducted at the TVI facility. In addition, there is no analytical data available documenting off-site migration of airborne transported hazardous substances from past or existing on-site sources. Also, there is no documentation of adverse health effects resulting from migration of hazardous substances through the air from the site.

The wind roses for the Dallas-Fort Worth International Airport, located approximately 20 miles to the northeast, is presented in Figure 4. Winds are predominately from the south-southeast, south and south-southwest, approximately 33% of the time, and wind speeds are generally less than 10 knot (11.5 MPH) approximately 60% of the time (Ref.26).



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Fort Worth, Texas

EPA ID# 980626048

Figure 4

Wind Rose Data
Fort Worth, Tx.

Targets

The TVI site is currently an inactive facility. The population estimates from 0 to 1 miles were calculated using a house count from a U.S.G.S. topographic map and a U.S. Census data book for 1994. The populations from 1 to 4 miles were taken from the Geographical Exposure Modeling System (GEMS) database (Reference 3). Based on this information the following population estimates were defined:

- 607 people within 0 - 0.25 miles of the site;
- 1,695 people between 0.25 - 0.50 miles of the site;
- 5,794 people between 0.50 - 1 mile of the site;
- 23,288 people within 1 - 2 miles of the site;
- 50,520 people between 2 - 3 miles of the site; and
- 65,995 people between 3 - 4 mile of the site.

The total population within a 4-mile radius of the site is 147,899 people (Reference 9).

There are no schools, day care centers, or residents within 200 feet of the site (Reference 9,16).

The nearest individual subject to exposure from a release of hazardous substances through the air is not known.

There are no wetlands within 4 miles of the site (Reference 24).

There are no Endangered Species or Sensitive Environments for the area (Reference 7). However, the Fort Worth Botanical Gardens (terrestrial sensitive environment) is located immediately to the east of the facility and receives offsite surface water runoff via a seasonal creek transacting the gardens.

Required Information (Data Gaps)

- Field verification of the distance to the nearest resident subject to exposure from a release of hazardous substances through the air.
- Field verification of potential targets in the target distance radii, in particular those located downwind to the north and northwest.
- Verification that there have been no reports of adverse health effects potentially resulting from releases of hazardous substances from the site into the air.

SECTION 3

SITE NONSAMPLING DATA COLLECTION AND FIELD WORK

The Texas Natural Resource Conservation Commission (TNRCC) will perform the activities described in this section to provide site background information and analytical data that can be used by the EPA to evaluate the site using the Hazard Ranking System (HRS). This information will be presented in a documentation report that includes groundwater, soil, and sediment sampling as discussed below.

All field work will be conducted in accordance with the health and safety plan (HSP) and the TNRCC-approved quality assurance project plan (QAPP). The HSP and QAPP are in Appendixes C and D, respectively. These plans will be reviewed by all personnel upon arrival at the site.

PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

The TNRCC Central Office Technical Director for this screening site inspection (SSI) is Mr. Wesley Newberry and the TNRCC Program Manager is Mr. Allan Seils. The TNRCC Site Investigation Manager is Mr. C. Todd Counter. Other team members will be identified prior to the sampling event. The TNRCC's Central Office mailing address is Pollution Cleanup Division, Emergency Response and Assessment Section, P.O Box 13087, Austin, Texas 78711-3087, (telephone no. (512) 239-2514, FAX no. (512) 239-2527).

The TNRCC Central Office Program Manager and Site Investigation Manager are responsible for identifying, assigning, and organizing the staff to execute the activities required to complete the SSI. The Site Investigation Manager is responsible for completing the activities described in this plan and adhering to the sampling activities and report schedule. The planned field schedule for activities at the TVI site is presented in Table 1.

The TNRCC Technical Director and Program Manager will review all major reports and provide technical and administrative support to the Site Investigation Manager. The TNRCC Technical Director will review the work plan and final report and will approve the final versions. In addition, the TNRCC Technical Director and Program Manager will provide oversight for the field activities during the investigation. The EPA Region VI site assessment manager (SAM) is responsible for approving the sampling activities work plan and reviewing the final report.

COMMUNITY RELATIONS

Prior to the start of any work at the site, TNRCC will inform the appropriate Tarrant County and/or City of Fort Worth authorities of the intended site visit. Individual residents and businesses in the immediate area will be contacted by letter from the TNRCC or during the off-site reconnaissance visit. Requests for site-specific information will be made during the interview process or identified in the letter from the TNRCC. TNRCC will make no other formal notifications of the SSI sampling events. Sample results will be sent to each property owner, for their property only, upon completion of the data quality assurance process. Any requests for information before or after the planned site inspection which the TNRCC receives from the above will be referred through the PA/SI Program Manager for an appropriate response. Any requests for information by the news media or parties not associated with the site will be directed through the TNRCC Technical Director or his designee to the TNRCC Central Office Media Relations Office, P.O. Box 13087, Austin, Tx 78711, telephone (512) 239-5000.

The TNRCC Program Manager will provide each member of the TNRCC inspection team and the Site Investigation Manager with letters of introduction stating the purpose of the investigation and authorization to conduct appropriate field activities. The TNRCC will send notification letters to the appropriate site representatives informing them of the impending sampling activities and requesting access authorization for TNRCC inspectors to the site. TNRCC will set up the site visit only after receiving written or verbal access authorization from the property owner or their representatives.

Table 1. Field Schedule
Trinity Valley Iron and Steel Company

Time	Activity
	Day 1
0800	Meet at TNRCC Central Office, load vehicles, and mobilize to site.
1300	Arrive at the site. Review health and safety plan. Conduct initial safety meeting. Conduct orientation (as required). Verify site specific data. Establish staging area.
1400	Begin on-site reconnaissance. Review and modify on-site sampling plan.
1800	End of day.
	Day 2
0730	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0800	Collect on-site soil samples, document sampling locations with photographs.
1200	Lunch break.
1300	Continue on-site soil sampling.
1400	Collect off-site overland migration pathway sediment samples.
1700	Complete Clear Fork sediment sample collection, packaging and CLP lab documentation. Pack samples for overnight shipment.
1800	Overnight courier will pick-up samples at site.
1900	End of day.
	Day 3
0730	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0800	Complete Clear Fork sediment sampling, packaging and CLP lab documentation. Pack samples for overnight shipment.
1100	Overnight courier will pick up samples at site.
1200	Lunch break.
1300	Pack equipment, demobilize for trip back to Austin.
1700	Arrive in Austin, end of event.

WORK PLAN ACTIVITIES

Task 1: Nonsampling and Sampling Activities and Rationale

The field team will first meet with property owner representatives and appropriate City and County authorities at the site (if specifically requested). The purpose of the meeting will be to conduct an initial safety briefing and review the intended sampling work schedule. Information concerning past and current site conditions outlined in the PA and SSI work plan will be discussed and verified. The Site Investigation Manager will record significant comments in the field logbook pertaining to site history and current/past operations.

After the initial meeting, an off-site reconnaissance inspection will be completed by designated team members. Information will be logged in the field logbook to include names of individuals interviewed, physical/mailing addresses, date and time of interviews, and observations noted. Information outlined in the Site Reconnaissance Checklist (Appendix D) applicable to off-site requirements will be obtained during the inspection. The off-site reconnaissance will be conducted at level D protection.

The initial on-site reconnaissance inspection will be accompanied by the owner or his designated representative, if available, to assist in identifying potential site hazards. Appropriate safety equipment will be required by each team member, which will include field respiratory protection with a combination organic/pesticide vapor cartridge and a dust/mist filter suitable for organic wastes. Personal protective equipment will initially be modified level D. If it can be established that volatile and semivolatile vapors are safely below background and action levels, the on-site reconnaissance will continue at modified level D.

Any visual evidence of a release of hazardous substances will be noted to ascertain whether additional protective equipment will be required for the sampling events. In general, site safety requirements will be assessed in the initial site reconnaissance inspection, and safe entry and exit points will be identified for each proposed sampling event.

Upon completion of the site reconnaissance activities, the field team will again review the sampling plan. Sample locations will be adjusted as necessary to ensure that the samples provide sufficient data to properly evaluate the site. Photographs will be taken as required to document site conditions and support observations recorded in the field logbook. Photographs will require at a minimum, the following information for each photograph:

- Site name
- Location
- Name of photographer
- Date and time of photograph
- Description of situation/scene photographed.

- Type of camera, film, and lens setting (Must be 50mm).

The following section describes the proposed sampling plan for the TVI site. This plan may be modified as a result of the on-site reconnaissance and/or noted site access constraints. The samples to be collected and sample rationale are listed in Table 2. Proposed sample analyses, containers, and preservation requirements for the groundwater and soil samples are shown in Tables 3 and 4, respectively. Sample locations will be confirmed during the site reconnaissance inspection and noted in the field logbook. A field copy of this workplan will be annotated by the Site Investigation Manager to reflect actual sample locations.

Table 2. Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Sediment	SE-01	PPE on Clear Fork Trinity River.	Document release of contaminants from TVI facility to Clear Fork Trinity River
	SE-02	PPE on Clear Fork Trinity River.	Document release of contaminants from TVI facility to Clear Fork Trinity River
	SE-03	Downstream of site on Clear Fork Trinity River.	Assess contamination to perennial waters.
	SE-04	Upstream of site on Clear Fork Trinity River approximately 700 feet upstream from PPE.	Obtain background sediment sample for attribution of contaminants to site .
	SE-05	Upstream of site on Clear Fork Trinity River approximately 800 feet upstream from PPE.	Obtain background sediment sample for attribution of contaminants to site
	SE-06	Upstream of site on Clear Fork Trinity River approximately 900 feet upstream from PPE.	Obtain background sediment sample for attribution of contaminants to site
	SE-07	Surface water pathway approximately 200 feet east of site within the botanical gardens.	Assess contamination along surface water pathway to Clear Fork Trinity River.
	SE-08	Surface water pathway approximately 200 feet east of site within the botanical gardens	Assess contamination along surface water pathway to Clear Fork Trinity River.
	SE-09	Surface water pathway approximately 900 feet east of site within the botanical gardens	Assess contamination along surface water pathway to Clear Fork Trinity River.
	SE-10	Quality Assurance/Quality Control (QA/QC)	Duplicate sediment sample collected at duplicate location of SE-07
Soil	SO-01	Soil/Source sample from retaining wall/fill area.	Assess possible soil contamination from retaining wall/fill area.
	SO-02	Soil/Source sample from retaining wall/fill area.	Assess possible soil contamination from retaining wall/fill area
	SO-03	Soil/Source sample from retaining wall/fill area.	Assess possible soil contamination from retaining wall/fill area.
	SO-04	Quality Assurance/Quality Control (QA/QC)	Assess possible soil contamination from retaining wall/fill area in duplicate location of S0-02.

Table 2-Cont.

Sample Matrix	Sample ID	Sample Location	Rationale
Soil Cont.	SO-5	Soil sample from undisturbed off-site location.	Obtain background soil sample for attribution of contaminants to site source.

Table 3. Sample Containers, Methods, Preservatives, and Holding Times for Soil/Sediment

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 120-ml widemouth glass vials with Teflon-lined septa	Cool to 4°C	14 days
Semivolatile organics	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Pesticides/ PCBs	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Metals	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	180 days after collection

Table 4. Sample Containers, Methods, Preservatives, and Holding Times for Aqueous Samples

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 40-ml widemouth glass vials with Teflon-lined septa	Cool to 4°C	7 days
Semivolatile organics	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Pesticides/PCBs	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Metals	One 1-liter polyethylene bottle with a Teflon-lined cap	HNO_3 to Ph<2	6 months (except mercury*)

* Reference: EPA Contract Laboratory Program Statement of Work for Organics Analysis (March 1990) and Statement of Work for Inorganic Analysis (March 1990).

Waste Containment/Hazardous Substance Identification

The primary contaminants of concern include arsenic, lead, cadmium, selenium, and phenol bearing wastes generated by the Trinity Valley Iron facility that still remain on-site in the existing fill/retaining wall area. These constituents may be present in shotblast fines and foundry form sands used to construct the retaining wall running the eastern and southern property boundaries of the TVI facility. To obtain legally defensible characterization data, a laboratory will be designated to perform EPA-stipulated Contract Laboratory Program (CLP) analytical methods on all samples collected from the site. The specific analytical methods for this sampling event are those listed under the CLP routine analytical services (RAS) contract.

Nonsampling data to be collected include:

- Field verify the site features and locations as depicted in Figure 2.
- Note any areas void of vegetation and obtain soil samples to confirm the release of contaminants.
- Field verify previous operations at the site and any hazardous substances related to these activities through observations and interviews with site personnel.

Samples collected for the surface water and soil exposure pathways will be used to characterize each media and to assess the potential migration of contaminants. In addition, sample will be collected from each media to determine the natural occurring background levels of inorganics (metals), organics (volatiles, semi-volatiles, PCBs and pesticides), and soil pH in an unaffected location.

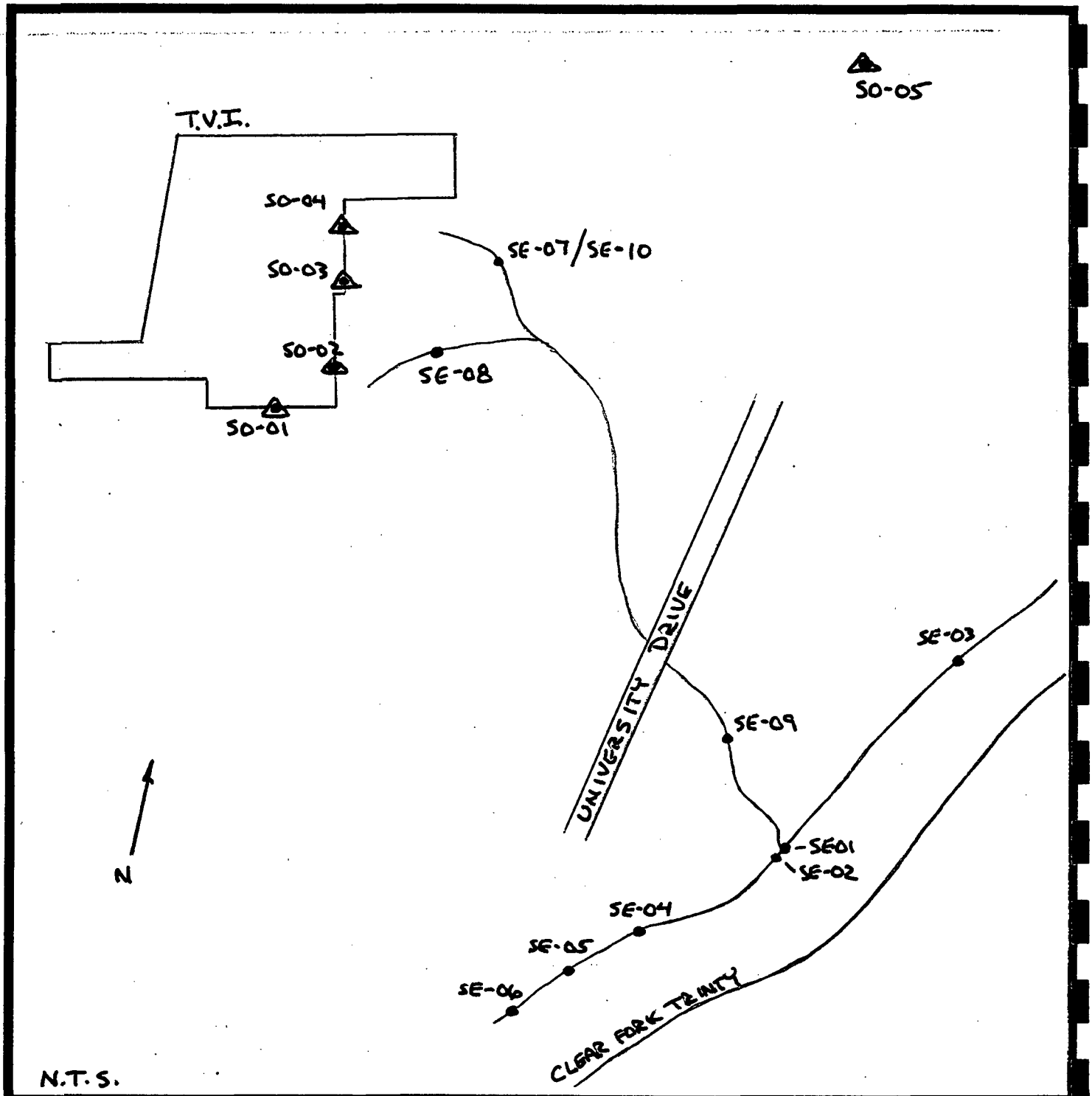
Four soil samples and a duplicate will be collected to characterize soils in the area of the fill/retaining wall area to assess the potential migration of contaminates from this area.

Soil samples will be collected within 6 inches of the upper soils surface using a dedicated stainless steel spoon. The samples will be collected from a depth close to the surface as possible, yet below the vegetation root zone. Deeper soil samples will be collected using a dedicated stainless steel spoon and exposed using a dedicated shovel should the soil be too packed to easily sample. Soil samples for VOA analysis will be collected first, non-volatiles second and metals last. Rocks and vegetation debris well be extracted from the sample as much as possible before placing the soil sample in the designated jars.

Groundwater Pathway

Nonsampling data to be collected includes:

- Field verification of existing well locations within 1 mile of the site. Verify by inspection and personnel interviews whether the wells are in use and the number of people served. Obtain water level measurements, well construction details, well development procedures, water quality test results, and aquifer pumping data from the well owners, if available.



TNRCC

Trinity Valley Iron

Fort Worth, Texas

EPA ID# 980626048

Figure 5

On-Site Soil and Off-Site Sediment Sample Location Map

No groundwater samples are planned to assess releases to the groundwater pathway. All wells identified by state records within one mile were confirmed plugged during the October 16, 1997 TVI site visti.

The surrounding communities within a 4-mile radius of the TVI facility are located within Fort Worth city limits. Drinking water for the Fort Worth facility is supplied by surface water obtained form the lakes along the Trinity River including; Lake Worth, Eagle Mountain, and Cedar Creek (Ref.17).

Surface Water Pathway

Nonsampling data to be collected include:

- Field verification of drainage patterns and soil exposure pathways surrounding the site.
- Field verification to determine fish production (fishing) from first perennial stream.
- Collect sample data to substantiate whether any contaminants have migrated from the site and along the overland migration pathway.
- Field verification that there are no additional sensitive environments, wetlands or endangered species within a 4-mile radius of the site or from the PPE to a distance of 15 miles dowstream.
- Obtain background sediment samples to determine the naturally occuring levels of contaminants in unaffected sediments in the vicinity of the site.

Surface water runoff from the site enters a seasonal creek imediately to the east of the site within the Fort Worth Botanical Gardens. The seasonal creek than runs through the botanical gardens for approximately 0.75 miles where it then drains into the Clear Fork Trinity River. A total of nine sediment samples and a duplicate will be collected for purposes of this SSI. Three sediment samples will be collected from the Clear Fork Trinity upstream of the PPE to determine background sediment concentrations. These samples will be numbered SE-4 through SE-6. Two sediment samples, numbered SE-1 and SE-2 will be collected from the PPE on the Clear Fork Trinity to assess the extent of contamination to the surface water pathway. One sediment sample, SE-3 will be collected downstream of the PPE (SE-1, SE-2). Four additional samples including a duplicate will be collected from the seasonal creek running from the TVI facility to the Clear Fork Trinity to assess contamination to the overland migration pathway. The samples will be numbered SE-7, SE-8, SE-9, and SE-10 respectively.

Sediment sample descriptions and sampling rationale are provided in Table 2. Approximate sample locations are illustrated in Figure 5.

Sediment samples will be collected form areas of quiescent settling with low hydrologic activity or energy in order to collect a representative fraction of the sediment. Sampling will be performed with dedicated stainless steel spoons. Each of the volatile and non-volatile organic and

inorganic sediment samples will be placed in two 4-ounce, widemouth glass jars and sealed with Teflon-lined lids. No headspace will be left in the VOA sample jars. Sample jars will be marked for identification and placed on ice for preservation. Identification markings will include: site location, sample number, type (composite of grab), date and time of collection, concentration (low, medium, or high), analysis parameters requested, and names of samplers.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Proper sample containers, preservation, and holding times for CLP soil samples are presented in Table 3.

Soil Exposure Pathway

Nonsampling data to be collected include:

- Field verification of drainage patterns and soil exposure pathways surrounding the site.
- Verification of the distance to the nearest residence and number of occupants.
- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site. Establish the location of the identified sensitive environments through correspondence or field verification.

No documentation of off-site migration of contaminants from the TVI facility has been documented, therefore, no off-site soil samples will be collected as part of this SSI. A total of four soil samples including a duplicate will be collected from soils within the fill/retaining wall area. The soil samples will be collected from soils within six inches of depth from soils that comprise the retaining wall. Figure 5 depicts the locations of the on-site soil locations.

As specified by the QAPP, samples will be placed in glass jars and sealed with Teflon-lined lids. Volatile organic samples will be placed in two 120-ml widemouth glass vials. Non-volatile and inorganic samples will be placed in two 4-ounce, widemouth glass jars. No headspace will be left in the V.A. sample jars. Sample jars will be marked for identification and placed on ice for preservation. Identification markings will include: site location, sample number, date and time of collection, and names of samplers.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Equipment and personnel decontamination procedures are described in the QAPP. Proper sample containers, preservation, and holding times for CLP soil samples are presented in Table 3.

Air Pathway

Nonsampling data to be collected include:

- Field verification of the distance to the nearest resident subject to exposure from a release of hazardous substances through the air.
- Field verification of potential targets in the target distance radii, in particular those located downwind to the north and northwest.

- Verification that there have been no reports of adverse health effects potentially resulting from releases of hazardous substances from the site into the air.

No air samples are planned to assess releases to the air pathway; however, results of surface soil samples collected for the soil exposure pathway will be used to assess potential for releases to occur to the air pathway. During the verification of residents within the immediate area of the TVI facility soil samples may be collected to determine a release to these target areas via the air exposure pathway.

Quality Assurance/Quality Control Samples

Three types of QA/QC samples will be used in this sampling inspection. Duplicate samples will be collected at the rate of one (1) duplicate per matrix (sediment and soil) and one (1) duplicate for every ten (10) samples collected. Temperature blanks will accompany each ice chest to the respective laboratories.

Organic contaminates and some inorganic contaminates may volatilize during collection and subsequent shipment to the laboratory due to warming temperatures in the shipping container; therefore, a temperature blank will be monitored to insure that samples are properly cooled during shipment. One temperature blank per ice cooler will accompany the sample bottles to the laboratory. Each temperature blank will be prepared by filling one V.A. vial with deionized water; enclosing it in a bubble bag; taping the package to the interior of the ice cooler and clearly marking it as the "temperature blank". Temperature blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. Results of shipment temperatures will be maintained with the corresponding sample analytical data in the project file.

Task 2: Decontamination Procedures

Equipment Decontamination

Proper decontamination procedures will aid in preserving the representativeness of the samples collected. Dedicated sampling spoons or trowels will be used to collect each soil sample at the site. These spoons or trowels will have been decontaminated prior to arrival at the site and sealed in plastic sealable bags in accordance with the QAPP. After sampling, gross contamination (visible) will be removed from the surface of the scoops or trowels and they will be placed back in their original plastic bag. Further decontamination will be accomplished by a detergent scrub and distilled water rinse at a location away from the investigation site in accordance with the QAPP. To minimize cross contamination, the outside of each sample container will be wiped clean with clean paper towels prior to placing the container into a plastic bag and bubble-wrapping it for shipment. An effort will be made to initially keep the outside of the containers free of gross contamination.

If sample equipment (non-dedicated) must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and an equipment rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater.

Decontamination fluids used to clean equipment will be disposed of on-site in the approximate area of the sampling location in accordance with investigation derived waste (IDW) guidelines. Equipment decontamination will not be necessary for domestic wells since the water sample is collected directly from the tap.

Personal Decontamination

All disposable clothing (i.e., Tyvek, gloves, etc.) will be rendered unusable prior to disposal to prevent inadvertent reuse. Boots will be scrubbed with detergent and rinsed with distilled water that will be disposed of on-site. Decontamination fluids from the rinse (if used) will also be disposed of on-site. Locations for IDW disposal will be noted in the field log book.

Task 3: Sample Shipping

During sampling activities, samples will be packed and preserved according to procedures described in the QAPP. Excess soil or liquid will be removed from the outside of each sample prior to placing it in a sealable plastic bag and placing it into an ice cooler packed with sealed ice bags. The Site Investigation Manager will assure that all appropriate paperwork necessary to ship samples to CLP laboratories for analysis is completed. Normally, a 35-day turnaround time for RAS will be requested. Details of the sample handling and chain-of-custody (COC) requirements are discussed in greater detail in the attached QAPP (Appendix D).

Samples collected each day will be shipped and delivered daily to the designated CLP laboratory for analysis using an overnight courier. The overnight freight courier pickup point and office schedule in the area of the site is:

Airborne Express (1-800-247-2676)
4871 N. Beach Street
Fort Worth, Texas
Office hours - 7:00am to 9:00 pm, Monday through Friday

The chain-of-custody forms will be checked, signed, and placed in a sealable plastic bag and taped to the inside lid of the cooler. The outside of the cooler will be sealed with tamper-resistant tape which cannot be removed without tearing it. The sample custodian will sign across the seal prior to shipping the samples. In the event the shipper has to remove the cooler seal, the receiving laboratory will verify and record that the individual container, bottle, or vial sample seals are still intact.

During sampling and sample shipment, the site Investigation Manager (or his designee) will contact the CLP sample management office (SMO) representative, as designated on the CLP RAS Lab Assignment, each day that a shipment is sent. If there are any significant changes to the CLP analytical requirements, contact the TNRCC Central Office, Allan Seils, PA/SI Program Manager at (512) 239-2514, FAX (512) 239-2527 or his designee to coordinate and obtain approval for additional analytical requirements.

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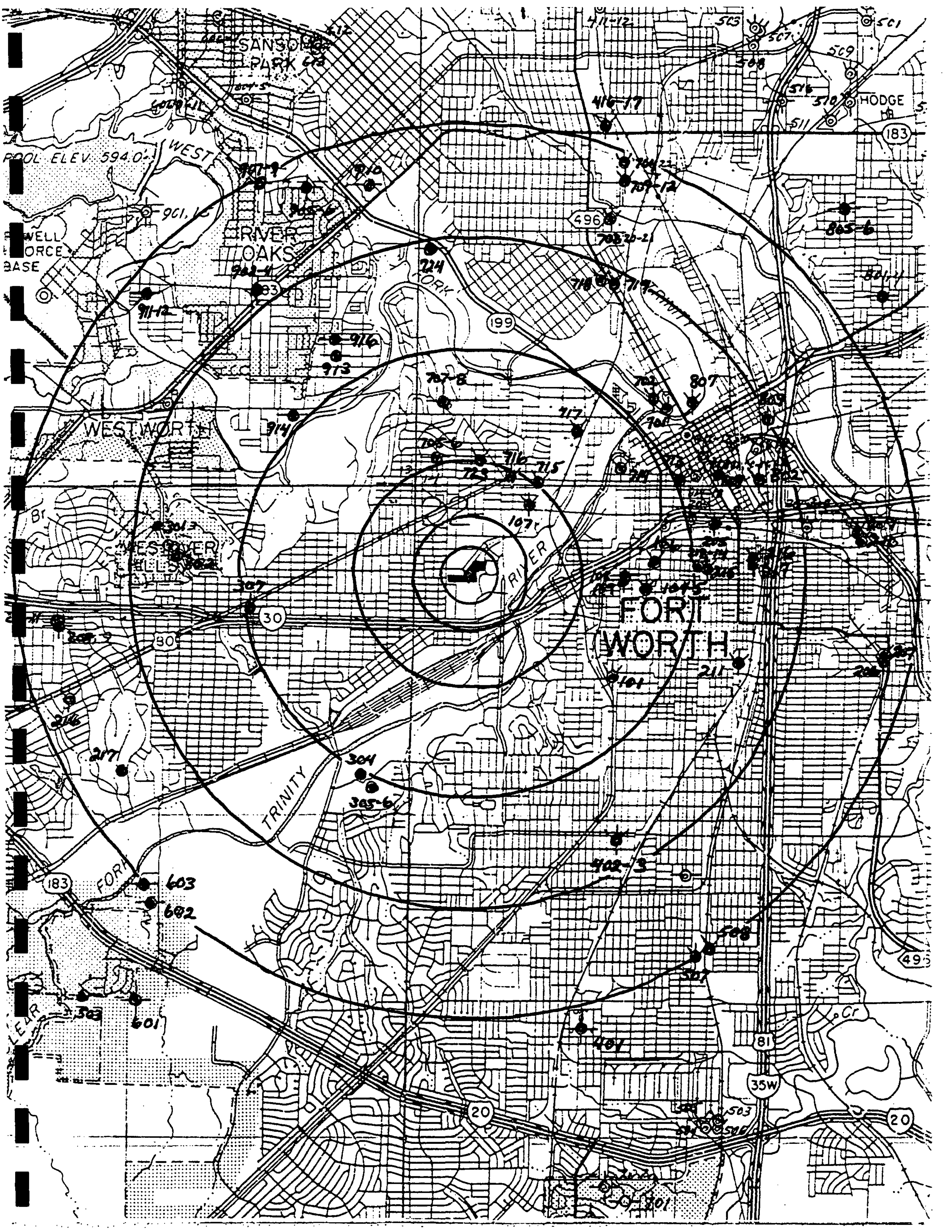
APPENDIX A

Well Location Map & Logs


SANSOM PARK
POOL ELEV 594.0
WEST
RIVER OAKS
HODGE
183
496
199
WESTWORTH
WESTOVER HILLS
RIVER
FORT WORTH
30
80
TRINITY
FORK
183
81
35W
20
20

Site Name TRINITY Valley ETHON
Well Type LOCATED
Date 10/1/96

	State Well Number	Miles From Site	TD	SWL	Screened Interval	Type	Date Drilled	Water Bearing Formation	Owner
	—	.25	—	No	Wells	Found	—	—	—
	—	.5	—	No	Wells	Found	—	—	—
✓	32-22-107	1	286	—	—	I	1946	—	MONARCH LAUNDRY
✓	32-14-716	1	309	210	—	I/plugd	1948	Kp	manhattan cleaners
✓	11-715	2	241	168	—	I	1953	Kp	KITES custom
✓	11-723	2	350	—	—	I	—	KCPA	Sanitary Water Co
✓	11-705	2	998	486	—	Plugd	1943	Kfm	TX. Water Co.
✓	11-706	2	306	240	—	Plugd	1943	Kp	Tx Water Co.
✓	11-707	2	750	364	—	plugged	1943	Kfm	Tx. Water Co.
✓	11-708	2	254	173	—	Plugged	1941	Kp	TX. water Co.
✓	11-717	2	351	220	—	I	1964	Paluxy	CLEAN Towels + Laundry
	11-714	2	—	File	Not	Found	—	—	—
✓	32-22-106	2	—	File	Not	Found	—	—	—
✓	11-104	2	396	293	313-396	I	1937	—	Harris Hospital
✓	11-105	2	455	—	292-413	I	1959	—	11
	11-108	2	—	File	Not	Found	—	—	—
	11-109	2	—	11	11	11	—	—	—
✓	11-101	2	429	—	409-429	I	1975	—	Bertrand
✓	32-21-307	2	384	270	284-333 330-360	I	1955	Paluxy	Champlin Refining
✓	32-13-911	3	280	165	—	PS	1969	Paluxy	TX. MOBILE HOME PARK
✓	11-913	3	241	90	174-208	PS	1969	11	GREEN ACRES MOBILE HOMES
✓	11-916	3	241	96	174-208	PS	1969	Kpa	PAGE
✓	32-14-724	3	210	40	—	D	1939	Paluxy	J.H. Massey
✓	32-14-718	3	375	—	—	I	1926	Kp	FT. WORTH LAUNDRY

Type: D - Domestic, S - Stock, PS - Public Supply, M - Monitor, ND - Not Drinking, I - Industrial, EL - Electric Log, Obs - Observation, Irr - Irrigation, T - Test, O - Other

TEXAS WATER DEVELOPMENT BOARD

WELL SCHEDULE

Aquifer Kp Field No. E-145 State Well No. 32-22-107

Owner's Well No. County TARRANT

1. Location: 1/4, 1/4 Sec., Block Survey

2. Owner: MONARCH LAUNDRY & Cleaners Address: 2832 W. Lancaster

Tenant: Address:

Driller: E.H. RICHARDSON Address:

3. Elevation of LS is 550 ft. above msl, determined by TOPO

4. Drilled: 19 46; Dug, Cable Tool, Rotary,

5. Depth: Rept. 286 ft. Meas. ft.

6. Completion: Open Hole, Straight Wall, Underreamed, Gravel Packed

7. Pump: Mfgr. Pomona Type Turb

No. Stages, Bowls Diam. in., Setting ft.

Column Diam. in., Length Tailpipe ft.

8. Motor: Fuel Elec Make & Model HP. 7 1/2

9. Yield: Flow gpm, Pump 35 gpm, Meas. (Rept.), Est.

10. Performance Test: Date Length of Test Made by

Static Level ft. Pumping Level ft. Drawdown ft.

Production gpm Specific Capacity gpm/ft.

CASING & BLANK PIPE

Cemented From ft. to ft.

Diam. (in.)	Type	Setting, ft. from	to
6	steel		
5	liner		

11. Water Level: ft. rept. meas. 19 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

ft. rept. meas. 19 above/below which is ft. above/below surface.

12. Use: Dom., Stock, Public Supply, (Ind.), Irr., Waterflooding, Observation, (Not Used.) bldg. burnt out

13. Quality: (Remarks on taste, odor, color, etc.)

Temp. °F, Date sampled for analysis Laboratory

Temp. °F, Date sampled for analysis Laboratory

Temp. °F, Date sampled for analysis Laboratory

WELL SCREEN

Screen Openings

Diam. (in.)	Type	Setting, ft. from	to

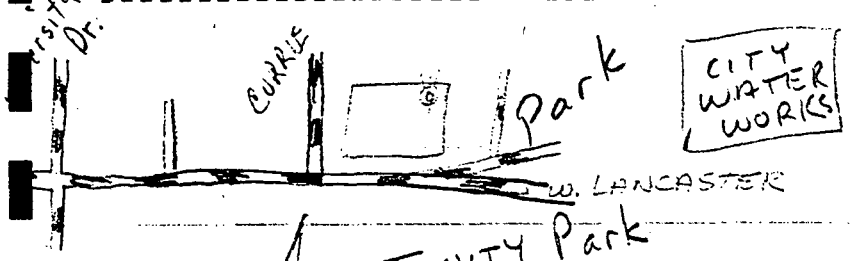
14. Other data available as circled: Driller's Log, Radioactivity Log, Electric Log, Formation Samples, Pumping Test,

15. Record by: P. Nordstrom Date 7-30 1975

Source of Data Bull. 5709

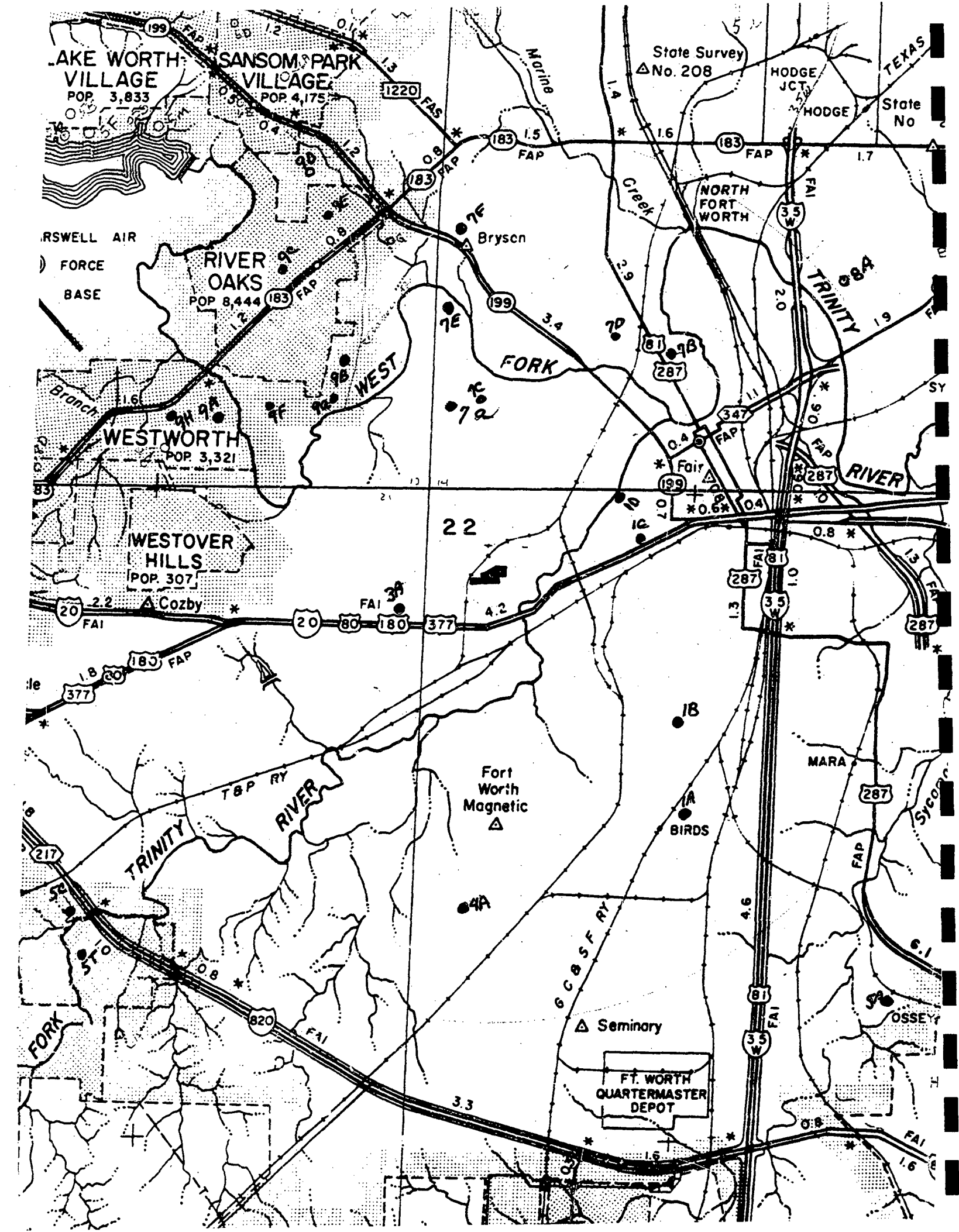
16. Remarks: 13,125 gpd - 42 hrs/week

Place completely burnt out



TWDBE-WD-2 (Sketch)

32-22-107


LAKE WORTH VILLAGE
POP. 3,833
SANSOM PARK VILLAGE
POP. 4,175
RIVER OAKS
POP 8,444
WESTWORTH
POP. 3,321
WESTOVER HILLS
POP. 307
Cozby
Bryson
State Survey
No. 208
HODGE JCT.
HODGE
NORTH FORT WORTH
TRINITY
RIVER
WEST FORK
Fair
Fort Worth Magnetic
MARA
BIRDS
Seminary
FT. WORTH QUARTERMASTER DEPOT
TBP RY
G C & S F RY
Marine Creek
22
199
183
1220
FAS
FAP
FAI
20
80
180
377
287
81
35 W
820
217

GENERAL HIGHWAY MAP

TARRANT COUNTY

TEXAS

PREPARED BY THE

STATE DEPARTMENT OF HIGHWAYS

AND PUBLIC TRANSPORTATION

TRANSPORTATION PLANNING DIVISION

IN COOPERATION WITH THE

U S DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

SCALE

1976

1970 CENSUS FIGURES

HIGHWAYS REVISED TO JUNE 1976

Site Name TRINITY Valley IRON
Well Type PLATED
Date 10/1/96

	State Well Number	Miles From Site	TD	SWL	Screened Interval	Type	Date Drilled	Water Bearing Formation	Owner
	—	.25	—	No	wells	Found	—	—	—
	—	.5	—	No	wells	Found	—	—	—
✓	32-21-3A	1	230	119	NA	D	1964	NA	Tom King
	32-14-7A	2	File	Not	Found	—	—	—	—
✓	" -7C	2	230	—	150-230	Irr	73	—	Charles Courtney
✓	32-22-1D	2	220	—	140-220	D	82	—	Thompson
✓	32-22-1C	2	200	100	0-200	D	79	—	Ralph Wright
✓	32-13-9A 32-13-9A Dup.	3 W/W	220 160	95 —	190-220 120-160	D D	65 —	— —	- MAX - EYSSEN
✓	" 9F 9F Dup.	W/W	250 255	— —	180-250 155-255	I Irr	78 78	— —	Merry SANDER
✓	" -9B	3	241	90	174-178 190-194 201-209	D	69	—	PAGE
✓	32-14-7E	3	80	40	—	Irr	80	—	Betty JONES
✓	" -7D	3	180	18	0-180	D	—	—	WAYNE FAIR
✓	" -7B	3	150	20	—	D	1986	—	Mauser
✓	32-22-1D 32-22-1B Dup.	3 3	422 638	342 490	— —	D I	1979 1983	— —	HYSON Schwab Co.
✓	" -1A	3	File	Not	Found	—	—	—	—
✓	32-13-9H	4	196	37	88-196	D	1984	—	Homer Davis
✓	" -9C	4	222	—	160-222	Irr	1974	—	Mrs. BISHOP
✓	" -9E	4	227	—	—	D	1975	—	FT. WORTH Well Service
	32-14-7F	4	file	Not	Found	—	—	—	—
✓	32-22-4A	4	140	62	110-130	D	1978	—	Simpson

Type: D - Domestic, S - Stock, PS - Public Supply, M- Monitor, ND - Not Drinking, I - Industrial, EL - Electric Log, Obs - Observation, Irr - Irrigation, T - Test, O - Other

File original copy with
Texas Water Commission
P. O. Box 2311, Capitol Station
Austin 11, Texas

State of Texas

DRILLERS LOG AND WELL DATA REPORT

For use by TWC only
Well No. 32-21-3?
Located on map
By [illegible] Date 6-6-
Map no. 220

1) Well Owner: (b) (6) (b) (6) Fort Worth, Texas
Name — Street or RFD — City — State

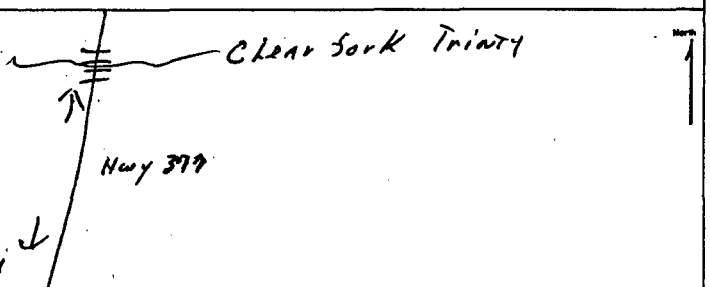
2) Land Owner: " " " " " " " "
Name — Street or RFD — City — State

3) Intended use: Industrial ☐ Municipal ☐ Irrigation ☐ Other Home

4) Location of well: County ~~Parker~~ TARRANT Labor _____ League _____ Abstract No. _____

NW¼ NE¼ SW¼ SE¼ (Circle as many as are known) of Section _____ Block No. _____ Survey _____

1 miles in SW (NE, SW, etc.) direction
from Clear Fork of Trinity River (Town)



Sketch map of well location with distances from two section or survey lines, and to landmarks, roads, and creeks.

DRILLERS LOG OF WELL

Method of drilling: Rotary Diameter of hole 6 3/4 in. Date drilled June 1964

All measurements made from _____ ft. above ground level.

From (ft)	To (ft)	Description and color of formation material	From (ft)	To (ft)	Description and color of formation material
0	1	Black Loam	52	58	Grey Lime
1	5	White & Yellow Clay	58	70	Grey Lime, Grey Shale
5	15	White Shale	70	102	Grey Lime
15	17	White Lime	102	125	Grey Shale
17	26	Grey Lime	125	147	Sand, Grey & Blue Shale
26	28	Grey Shale	147	153	Grey Lime & White Lime
28	45	Grey Lime	153	165	Blue, White & Grey Shale
45	52	Grey Shale			(Use continuation sheets if necessary)

(over) Continued

COMPLETION DATA

COMPLETION

Straight wall ☒
Under reamed ☐
Gravel packed ☐
Open hole ☐
Other _____

CASING

Type: Old ☐ New ☐
Cemented from 175 ft.
to 75' ft.

Diameter (inches)	Setting from (ft)	Setting to (ft)
4½ OD	0	230

SCREEN

Type _____
Perforated ☐ Slotted ☐

Diameter (inches)	Setting from (ft)	Setting to (ft)

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

Alfred L. Watts (Signature) Watts Drilling Co. (Company Name) Reg. No. 177

Please attach electric log, chemical analysis, and other pertinent information if available.

If well was tested by your company or if you installed the permanent pump please complete the following:

WATER LEVEL AND PUMP DATA

Static water level ~~xxx~~ 119'
ft. below ground level

Pumping level feet	hours	gpm

Pump type Submergible
Designed pumping rate 10 GPM gpm ☐ gph ☐
Type power unit Electrical
Horsepower One HP
Depth to bowls, cylinder, jet, etc., 170 ft. below pump base.

Name of contractor testing well or installing permanent pump if other than your company: _____

C-34 (62-4)

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN
FOR
SCREENING SITE INSPECTION FIELD WORK
TRINITY VALLEY IRON

Prepared by

Texas Natural Resource Conservation Commission
Superfund Site Discovery and Assessment Team
Austin, Texas

Reviewed and approved by

Site Safety Officer:	_____ Name	_____ Date
Site Investigation: Manager	Name	4/2/97 Date
PA/SI Program Manager Representative:	Name	4/3/97 Date
TNRCC Central Office Health & Safety Representative:	Name	4/2/97 Date

APRIL 1997

Contents

APPENDICES

FIGURES

TABLES

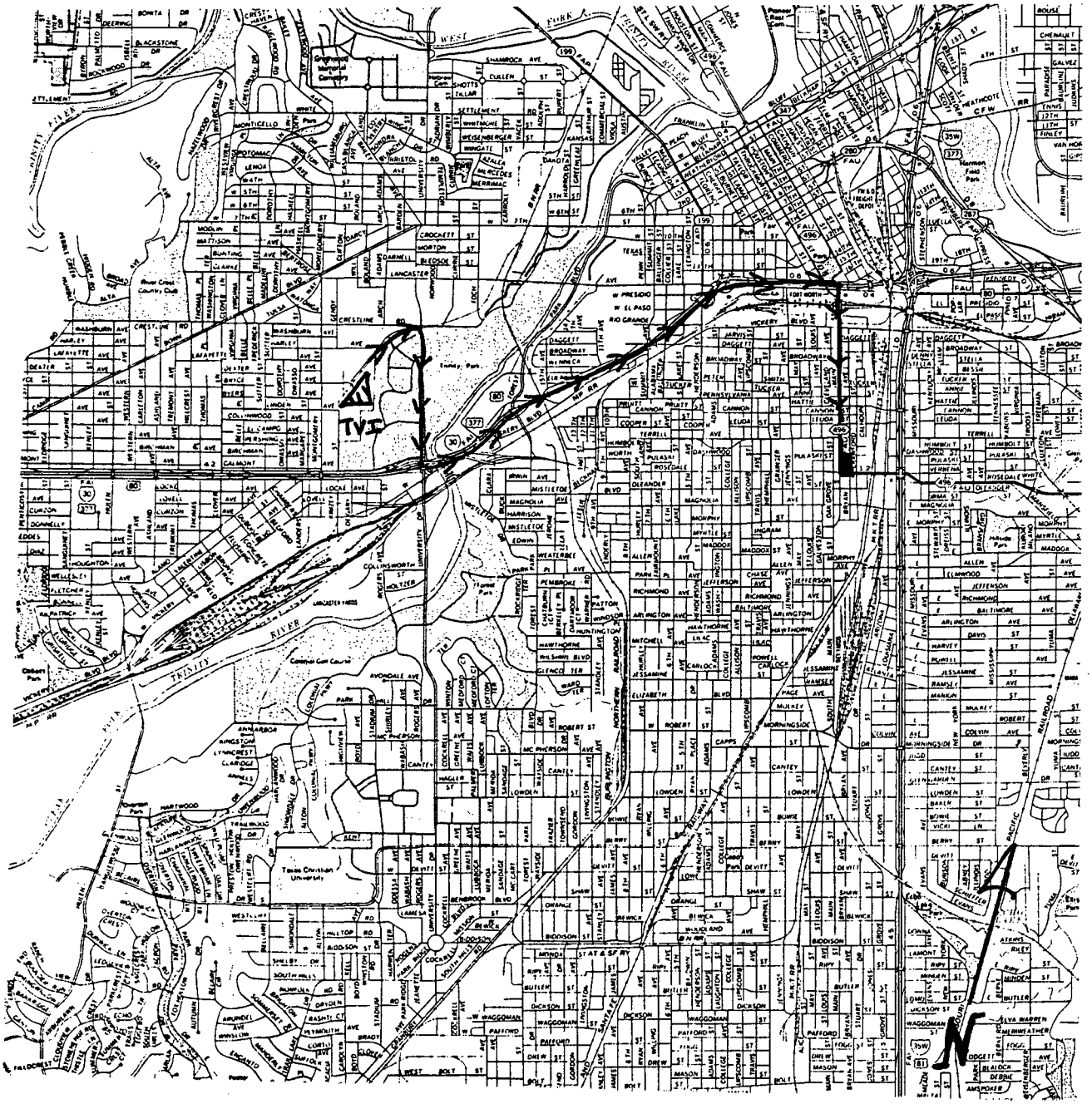
EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations contact the appropriate response teams:

Contingency Contacts	Phone Number
Fort Worth Fire Department	911 - (817)922-3000
Police	911 - (817)335-4222
Sheriff's Department	911 - (817)884-1212
Medical Emergency	911 or (817)922-3000
Hospital Name	St. Joseph Hospital Phone No.(817) 921-3431
Hospital Address	1500 S. Main Street Fort Worth, Texas

Map to Hospital (see next page)

TNRCC Contacts	
TNRCC PA/SI Program Manager:	Allan M. Seils- Austin, Texas Phone: Work (512) 239-2514
TNRCC Central Office Health & Safety Representative:	Todd Counter - Austin, Texas Phone: Work (512) 239-2591
TNRCC Field Health & Safety Representative:	To be Determined Phone: Work



TNRCC

Trinity Valley Iron

Fort Worth, Texas

EPA ID# 980626048

Figure V

Hospital Location Map

SECTION 1

INTRODUCTION

PURPOSE AND POLICY

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for work conducted for screening site inspections (SSI) under the Texas Natural Resource Conservation Commission (TNRCC) Preliminary Assessment/Site Investigation (PA/SI) program. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while field work is being conducted at the Trinity Valley Iron site in Tarrant County, Texas.

All personnel who engage in field project activities at the site must be familiar with this plan and comply with its requirements. The provisions of the plan are mandatory for all TNRCC field personnel on this project.

PROGRAM DESCRIPTION

This screening site inspection will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS) 40 CFR Part 300; Final Rule, dated December 14, 1990. TNRCC Central Office staff recently completed collecting information needed to prepare a work plan and this health and safety plan. TNRCC Central Office staff personnel may visit the site to assist in executing the work plan and/or conduct inspection activities. Activities that will be conducted during the site visit include: site reconnaissance, interviews with any site personnel, conducting a field screening survey and collection of soil and sediment samples. The anticipated time frame for the execution of all the field work is April 1997. This health and safety plan pertains to activities performed while executing the work plan.

SECTION 2

SITE INFORMATION

GENERAL INFORMATION

Site: Trinity Valley Iron and Steel

Location: 3400 Bryce Street, Fort Worth, Tarrant County, Texas

Mailing Address: McWayne, Inc., P.O.Box 607, Birmingham, AL. 35201

Proposed date of field work: April 1997

Hazard Assessment: ___ High _X_ Medium ___ Low
___ None ___ Unknown

Site description: The TVI site is located in Tarrant County at 3400 Bryce, Fort Worth, Texas. The inactive site, still owned by McWayne,Inc., occupies approximately 16 acres of in the vicinity of University Drive and Bryce Avenue. The site is located at approximately 32^0 44' 20'' north latitude and 97^0 22' 10'' west latitude. The Fort Worth Botanical Gardens borders the property to the east. Sometime after 1990 (exact time unknown) the owners of the facility removed all physical structures and buildings of the facility and began leasing the property to the Southwestern Exposition and Livestock Show for automobile parking.

TVI operated a grey iron foundry from 1924 until 1988. The site, covering approximately 15 acres, is inactive. The foundries process would remelt scrap metals in a cupola furnace to produce new cast iron products. Until 1984, slag was drawn off the top of the molten metal and drummed. After 1977, emissions from the cupola furnace were fed to a baghouse. The ash or dust from the baghouse was removed for disposal on-site in a landfill. The landfill was closed in accordance with an TNRCC approved closure plan in 1986, with TNRCC closure acceptance being granted for the closure on December 16, 1988.

While in operation the facility utilized drums filled with foundry waste (slag and shot-blasts fines) as bulkheading for fill material. The fill material consisted of foundry sand and shot-blast fines. This construction method was utilized to build up the eastern and southern portions of the property. The drums are stacked seven layers high (approximately 21 feet) and two and three rows deep. The approximate total linear feet of the drum/foundry waste wall structure is 2,467 feet. An exact estimate of the slag, shot-blast fines, and foundry for sands is unknown. Findings during a November 1987 Sampling Visit Report conducted by A. T. Kearney, Inc., for the EPA indicated that the shot-blast fines and foundry sands contain concentrations of napthalene, xylene, and phenols. Following a site visit by TNRCC personnel on October 16, 1996, the pathway of concern is the surface water pathway by human food chain target (fishery) on the Clear Fork Trinity River.

SCOPE OF WORK SUMMARY

The field team will conduct a field screening survey of residential and school properties in the areas north, northwest and west of the site and collect soil samples from both on-site and off-site areas and sediment samples from the nearest surface water body and overland migration pathway.

Samples collected for the soil and surface water exposure pathways will be used to characterize each media and to assess the potential migration of contaminants. In addition, samples wil be collected fro each media to determine the natural occuring background levels of inorganics (metals), organics (volatiles, semi-volatiles, PCBs and pesticides), and soil pH in an unaffected location.

Four soil samples and a duplicate will be collected to characterize soils in the area of the fill/retaining wall area to assess the potential migration of contaminants from this area.

A total of nine sediment samples and a duplicate will be collected for the purposes of this SSI. Three sediment samples will be collected from the Clear Fork Trinity River upstream of the PPE to determine background sediment concentrations. Four additional samples including a duplicate will be collected from the seasonal creek running from the TVI facility to the Clear Fork Trinity River to assess contamination to the overland migration pathway.

The sampling locations described above may be adjusted so that observed areas of contamination, as identified by potential soil contamination, visible soil staining, or visible leachate collection at the surface, are sampled.

All soil and sediment samples will be collected according to the procedures outlined in the QAPP, included as Appendix C in the Work Plan.

Sampling of ground water wells is not planned for this SSI sampling event due to a lack of know ground water targets. No air samples are planned to assess releases to the air pathway.

SITE/CHEMICAL CHARACTERISTICS

Chemical type(s):	___ Liquid	_X_ Solid	___ Sludge	___ Gas
Characteristic(s):	___ Corrosive	___ Ignitable	___ Radioactive	
	___ Volatile	___ Toxic	___ Reactive	
	_X_ Unknown	___ Other		

Summary of known wastes: See below.

List of chemicals used on site:

No specific chemical information was found associated with the fill/retaining wall area composed of drums filled with slag, shot blast fines, and foundry form sands. However, it is suspected that concentrations of lead, selinium, antimony, and phenols may exist in the fill material described above.

No additional information concerning chemicals used at the TVI site is currently available.

Description of all known waste disposal areas on site:
The information used to identify the waste characteristics at the TVI site was obtained from a review of the Sampling Visit Report and reports which have been submitted to the TNRCC. During site operations, there were various Solid Waste Management Units (SWMUs) that were used to dispose/handle process wastes. In 1988 the facility stopped operations and soon dismantled and removed all structures of the facility. Following the site reconnaissance conducted by TNRCC in October 1996 the main area of concern was recorded at the property. This "area of concern" is;

> Retaining Wall/Fill Area (slag,shot blast fines,foundry sand) - Throughout the operational lifetime of the facility the southeast portions of the property was backfilled over twenty-feet. A retaining wall was constructed with 55-gallon drums filled with foundry wastes including slag, shot blast fines, and foundry sands. The area behind the retaining wall was filled with foundry sands up to grade with the rest of the facility. The approximate total linear feet of the drum/foundry waste wall structure is 2,467 feet. An exact estimate of the slag, shot-blast fines, and foundry form sands is unknown. The spent foundry sand presents a potential source of phenol contamination in soils. Analysis of spent sand has shown levels of phenols at 101.5 ppm.

Table 2.2 - Chemicals of Record at the Trinity Valley Iron site (from NIOSH & ACGIH Pocket Guides)

Possible Chemical Contaminants	NIOSH REL (Recommended exposure levels for 10 hr wk day/40 hr week) ST (short term exposure level/15 minutes)	PEL (Permissible exposure limit for 8 hr days in a 40 hr week) ST (short term exposure level/15 minutes)	TLV (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	IDLH (Immediate Dangerous to life or health concentrations	Symptoms of Exposure (inhalation; skin absorption)
Phenol	19.0 mg/m^3	19.0 mg/m^3	**	250 mg/m^3	Eye,nose,throat irritation;anorexia,weight loss,weakness
Lead	0.100 mg/m^3	0.100 mg/m^3	**	100 mg/m^3	Inhalation, Ingestion, Contact: weakness, insomnia, abdominal pain, tremors, eye irritant.
Selenium	0.2 mg/m^3	0.2 mg/m^3	**	1.0 mg/m^3	Inhalation, Ingestion, Contact: Irrit. eyes, nose, throat and skin, visual disturbance, chills, fever
Antimony	0.5 mg/m^3	0.5 mg/m^3	**	50.0 mg/m^3	Inhalation:eye,skin, nose irritation; ingestion;throat, mouth, coughing, dizziness

ND = Not determined. Reduce exposure to lowest feasible concentrations.
N/A = Not available
ppm = Parts per million
ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
STEL = Short Term Exposure Limit.

Summary of off-site disposal:

TNRCC records indicate that baghouse dust from the facilities cupola furnace was sent to an approved landfill disposal area since 1977. Prior to 1977 the baghouse dust was stored in a on-site landfill that met approved closure by the TNRCC in 1986.

Unusual features (surface impoundment/tank integrity, power lines, terrain, etc.): The following observations concerning the current site conditions were observed during the SSI site visit conducted on October 16, 1997.

The structures at the facility were dismantled sometime in 1990. There currently are no structures located on-site with the exception being the facilities foundations and asphalt parking area both of wich are flush with ground elevation. The eastern and southern boudaries of the site are elevated approximately twenty feet above the natural surrounding area by soil fill and foudary form sands. The fill/sands are held in place by a retaining wall constructed of thousands of drums filled with foudary slag and shot blast fines. The retaining wall is approximately twenty feet high and has approximately 1,270 linear feet of run.

The site is bound by a chain link fence on the west and north. Controlled site access is through a metal gate from Bryce Street to the north. Reportedly, site access is controlled at all times.

Current status of site: The TVI site is currently inactive and abandoned. The only activities on-site is during activities conducted at the Southwestern Exposition and Livestock Show. During this time owners of TVI allow automobile parking on the property.

Summary of the regulatory history of the site: TVI operated a grey iron foundry from 1924 until 1988. The site, covering approximately 15 acres, is inactive. The foundries process would remelt scrap metals in a cupola furnace to produce new cast iron products. Until 1984, slag was drawn off the top of the molten metal and drummed. After 1977, emissions from the cupola furnace were fed to a baghouse. The ash or dust from the baghouse was removed for disposal in an on-site landfill. The landfill was closed in accordance with an TNRCC approved closure plan in 1986, with TNRCC closure acceptance being granted for the closure on December 16, 1988.

SECTION 3

PROJECT TEAM ORGANIZATION

Table 3.1 describes the responsibilities of all staff and on-site personnel associated with this project. The names of individuals associated with this project are listed below:

TNRCC PA/SI Program Manager:	Allan M. Seils, Austin, Texas
Staff Safety Officer:	C. Todd Counter, Austin, Texas
Site Investigation Manager:	C. Todd Counter, Austin, Texas
Site Safety Officer:	To Be Determined.

Personnel - The Site Investigation Manager designates the Site Health and Safety Officer who will be responsible to see that the site work is performed in a manner consistent with the Health and Safety Plan (HASP). The Site Health and Safety Officer will be responsible for Health and Safety briefings before each daily on-site inspection. **The Site Investigation Manager or the Site Health and Safety Officer may temporarily suspend field activities if health and safety of personnel are endangered. The Site Investigation Manager or the Site Health and Safety Offer may temporarily suspend an individual from the field activities for infractions of the HASP.**

Table 3.1
Staff and On-site Personnel

Title	General Description	Responsibilities
PA/SI Program Manager/ Deputy	Reports to upper-level management. Has authority to direct site investigation activities. Assumes responsibility of meeting all PA/SI program goals/objectives.	Prepares, organizes, and provides program support material. Reviews/approves the project Work Plan, Health and Safety Plan, and the Quality Assurance Project Plan. Appoints field team members for the field work.
		Briefs the Site Investigation Manager on his specific duties.
		Ensures, through the Staff Safety Officer, that safety and health requirements are met.
		Serves as the liaison with the Region VI EPA Representative.
Staff Safety Officer	Advises the PA/SI Program Manager on all aspects of health and safety. Reviews Health and Safety Plans submitted to Central Office.	Advises the PA/SI Program Manager on all health and safety issues. Reviews all project Health and Safety Plans to assure proper clothing and protective equipment are identified.
		Ensures that the proper protective clothing and safety equipment are available for the field investigation efforts.
Site Safety Officer	Advises the Site Investigation Manager on all aspects of health and safety. Assures proper field safety is implemented according to the project Health and Safety Plan.	Ensures that entry and exit controls at the site access control points are in place and maintained.
		Periodically inspects protective clothing and equipment.
		Confirms each team member's suitability for work based on a physician's recommendation.
		Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
		Implements the health and safety plan.
		Conducts periodic inspections to determine if the project Health and Safety Plan is being followed.
		Enforces the buddy system.

Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Safety Officer (Continued)		Notifies, when necessary, local public emergency officials in coordination with on-site representatives. Coordinates emergency medical care. Ensures setup of decontamination lines and solutions appropriate for the type of chemical contamination on the site. Controls decontamination of all equipment, personnel, and samples from the contaminated areas. Ensures proper disposal of contaminated clothing and materials. Advises medical personnel of potential exposures and consequences. Notifies emergency response personnel by telephone or radio in the event of an emergency. Ensures that all personnel can appropriately use the equipment.
Site Investigation Manager	Prepares Work Plan, and Health and Safety Plan for review/approval. Responsible for field investigation phase of the project.	Obtains permission for site access from the property owners or their representatives. Coordinates all field activities with the appropriate local community officials. Prepares the Work Plan and Health and Safety Plan for Central Office review/approval. Ensures that the work plan is complete and submitted to meet schedule requirements. Executes the Work Plan, Health and Safety Plan, and assures QAPP requirements are met according to the project schedule. Enforces safety procedures through the Site Safety Officer. Documents field activities and sample collection efforts. Serves as a liaison with the on-site client representative.

Table 3.1
Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Investigation Manager (Continued)		Prepares and submits the final report and required support documentation for Central Office approval.
Field Team Members	Perform field activities as instructed by Site Investigation Manager.	Safely complete the on-site tasks required to fulfill the work plan. Notify Site Safety Officer or supervisor immediately of suspected or noted unsafe conditions observed in the field. Take precautions necessary to prevent injury to themselves and other employees. Read, sign-off, and comply with the project Health and Safety Plan before entering the site for field activities. Maintain visual contact between partners (buddy system). Perform only those tasks they believe they can do safely. Immediately report to the field team leader any accidents and/or unsafe conditions, or any deviations from the Health and Safety Plan.

SECTION 4

SAFETY AND HEALTH RISK ANALYSIS

RESPIRATORY HAZARDS

Respiratory hazards may exist on site from the potential presence of heavy metal contaminants, which could be inhaled if dust were produced during soil sampling activities.

CHEMICAL HAZARDS

Chemical hazards can exist when liquid, vapors, or soil samples contact human tissue. Every effort will be made to avoid inadvertent contact with the chemical media at the site. Since soil and sediment samples will be collected, protective equipment will be used to avoid physical contact. The chemical hazards at the site may include: liquids, soils and leachate from the landfill containing hazardous substances, volatile and semivolatile organics, and priority pollutant metals detected during previous investigations. Also, another potential hazard, although not expected to be encountered, is contact with acidic soils or water.

Information on the contaminants that may be encountered at the site is presented in Section 2. The site may contain other hazardous chemicals that may release hazardous or toxic vapors. The site will be approached with caution, and any moving or handling of drums, containers, or equipment will be avoided.

Airborne particulates from heavy metal contaminated soils and miscellaneous piles of Class III waste found on-site may pose an additional chemical hazard. Since particulates are of concern, high winds and sampling activities which create dust and cause these particulate to become airborne, will impose a requirement to modify operating procedures. If these conditions occur at the site, work will be conducted upwind of the hazard. If the wind conditions change or a sampling activity results in particulate matter becoming a factor, the site will be evacuated, as necessary, to minimize unnecessary exposure, or appropriate safety protection equipment will be used.

During the course of field investigations, certain chemicals are used for the preservation of samples, decontamination of equipment and calibration of equipment. The chemicals of record used during field investigations are shown in table 4.1. Some or all of the chemicals shown may be used during the sampling event at the TVI site.

Proper protective equipment should be utilized when working with these chemicals and all personnel should avoid inhalation of chemical vapors or contact with the skin.

Table 4.1 Chemicals of Record Used for Field Investigations

Chemical	TLV a/	(OSHA) PEL b/	Odor Threshold (ppm)	IDLH c/ (ppm)	Comments
Hexane	50	500		500	Calibration for HNU PI-101 photoionization detector. No anticipated problems since hexane in cylinder is only 0.14 percent by volume with air.
Nitric Acid	2	2		100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Hydrochloric Acid	(C),5	(C),5	1-5	100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Isopropanol	400			12,000	Decontamination fluid. Wear gloves when cleaning equipment.

ppm = Parts per million
ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
C = denotes Ceiling limit

ROUTES OF EXPOSURE

The field team may be exposed to contaminated materials through inhalation, ingestion, and/or skin and eye contact.

- Respiratory system contact with hazardous airborne materials can occur. If these conditions exist, field work will be conducted upwind, proper protective equipment will be used, or the site will be evacuated.

- Eye contact with solid samples that are contaminated can occur when a worker does not wear safety glasses while samples are being taken or handled.

- Skin contact with contaminated solid or liquid samples can occur when a worker does not wear gloves and protective clothing during sampling activities.

- Gastrointestinal system contact with samples can occur when workers do not observe personal hygiene rules designed to reduce the chance of ingesting site contaminants (i.e., wash hands before smoking, eating, or drinking).

PHYSICAL HAZARDS

Abandoned Sites

The site is currently abandoned. There may be unknown physical hazards encountered during site sampling events that could cause physical injury. The structural integrity of the retaining wall presenst unknown physical hazards. Field work should be performed using all normal safety precautions. The Health and Safety Plan guidelines concerning avoiding physical hazards will be followed, as a minimum. In addition,

- Unnecessary moving or opening any heavy or bulky containers, drums, bags, etc., will be avoided;

- The "buddy" system will be used at all times.

Heat Stress

If elevated temperatures are encountered, heat stress may occur. Field work may be performed when daytime temperatures are often high. Water will be available on site, and the Site Safety Officer will encourage workers to drink frequently to prevent dehydration and stay in shaded areas whenever possible. In addition, workers should adhere to the recommended work/rest schedule determined by the Site Safety Officer. Depending on work levels and outside temperatures, each individual should monitor his body temperature and note indications of heat stress as they onset. The "buddy" system will be used at all times to check each other for the first symptoms of heat stress.

Heat stress/stroke control. The TNRCC Site Safety Officer will set work and break schedules depending on the outside temperature. General guidelines for heat stress control while sampling include rest breaks in the shade for at least 10 minutes out of every hour during elevated temperatures. Rest time shall also include fluid replacement with water or electrolytes fluids.

Heat stress/stroke monitoring. The TNRCC Site Safety Officer will monitor workers who are performing strenuous activities in elevated temperatures for heat stress/ stroke. Monitoring will be conducted at the Site Safety Officers discretion, worker's request, or at the beginning of a rest period. The monitoring shall also be conducted when workers performance or mental status significantly changes. The heat stress monitoring plan may include:

- Measurement of worker heart rate, OR
- Measurement of body temperature, and
- Observation of the field team members for signs and symptoms of heat injury.

Heart rate (HR) will be measured by the radial pulse for 30 seconds as early as possible during the resting period. The HR at the beginning of the rest period should **not exceed 100 beats per minute.** If the HR exceeds 100 beats per minute, the next work period will be shortened by one third while the length of the rest period remains the same.

Body temperature will be measured using an oral thermometer. Worker **body temperature should not exceed 99.6°F.** If the worker's body temperature exceeds this, the work period will be shortened by one third while the length of the rest period remains the same. No person will be permitted to wear a semipermeable or impermeable garment **when body temperature exceeds 100.6°F.**

Table 4.2 presents suggested frequencies for heat monitoring. Heat stress monitoring will be performed by a person with a current first-aid certification. Workers that exhibit signs of heat injury will be allowed to rest until the signs are no longer observable. The signs of heat stress/stroke are depicted in Figures 4.1 and 4.2. Suggested emergency medical procedures for treating heat exhaustion and heat stroke are also provided.

Cold Injury

It is anticipated that the field sampling activities will occur during the winter months. All field personnel should be especially alert to the possibility of cold injuries, which are most likely to occur when an unprotected individual is exposed to cold temperatures. Temperature, humidity, precipitation, and wind all play roles in the development of cold injuries. The most serious cold injuries are hypothermia and frostbite. Dehydration can also occur if insufficient fluids are not taken as in hot weather. In cold weather, the individual may not be as aware of the problem since perspiration evaporates rapidly or is absorbed by layers of heavy clothing.

53 Heat Exhaustion/ Heat Cramps

Signs & Symptoms: cool, pale, clammy skin / fatigue and faintness/headache/ heavy sweating/weak pulse/near-normal body temperature/nausea. Onset is gradual.

If person is unconscious, see *Heatstroke*, p. 64.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.

If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

Have the person lie down. Elevate legs and feet with pillows or rolled blankets.

Loosen or remove clothing. Cool the skin with cool, wet sponges or cloths applied to forehead, arms, and legs

See explanation on bottom of page

If the person has *no* heart problems or high blood pressure and is fully conscious, give sips of a salt solution (1 teaspoon salt to 16 oz. — 2 cups — water) every 15 minutes for about one hour. Check body temperature every 5 minutes and continue to cool with wet cloths.

If the person complains of muscle cramps, do not massage cramped muscles. This may increase pain

Does temperature suddenly rise? Are there convulsions, stupor, or unconsciousness?

Yes

If any of these occur, see *Heatstroke*, p. 64.

No

Does the person begin to feel better after one hour?

Yes

Keep person out of the sun and as cool and comfortable as possible.

No

Seek medical care immediately. While awaiting assistance, continue cooling with wet cloths and checking body temperature frequently.

Person should be checked by a doctor as a precaution. Discourage unnecessary exercise; this person may now be more susceptible to heat. If symptoms reappear, repeat process and call a physician.

Smelling salts, held briefly under the nose, may help to stimulate the person.

If the temperature suddenly rises or convulsions, stupor, or unconsciousness develop, see *Heatstroke*, p. 64.

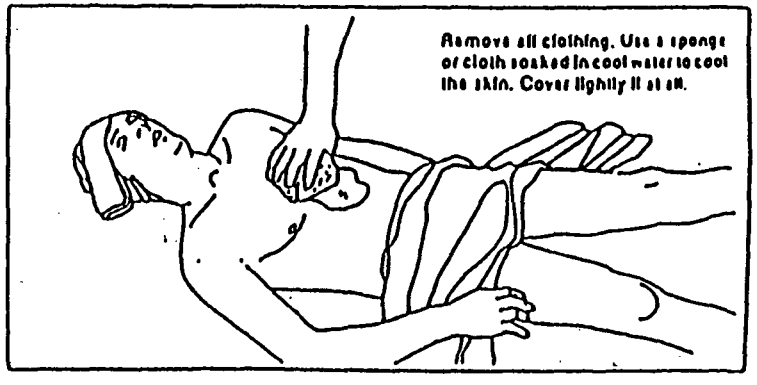


Figure 4.1

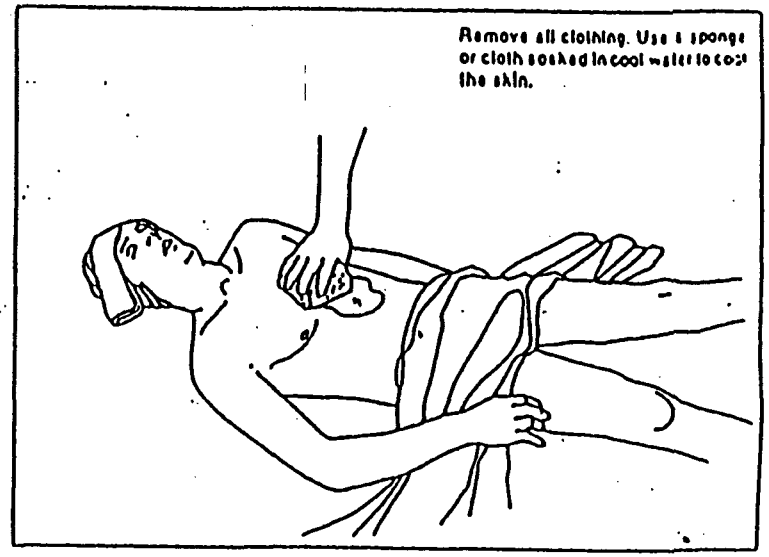
Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

5d Heatstroke

Signs & Symptoms: *red, hot, dry skin/no perspiration/body temperature around 106°F (or very warm to the touch)/strong rapid pulse/stupor or unconsciousness*

If there are two or more rescuers, one should obtain emergency assistance while the other is following the procedures outlined below.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.



If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

Remove all clothing. Use a sponge, cloth, or sheet soaked in cool water to cool the skin, wetting the material often, or immerse the person in a bathtub filled with cool water.

Do convulsions occur?

No

Yes

See convulsion on opposite page

Remove objects that may cause injury and place pillows or rolled blankets around head to prevent injury. Do not try to hold person down. Do not place anything between teeth.

Watch for breathing problems. If breathing stops, see *Artificial Respiration*, p. 4

Check temperature every 5-10 minutes until it drops to 100-102°F, then discontinue sponging or immersion. If you have no thermometer, continue cooling process until person feels cool

Is there a history of heart problems?

No

Yes

Have the person lie flat. Do not cover unless chilled. Then cover lightly.

While awaiting assistance, keep person as cool and comfortable as possible and continue to watch for breathing problems. Check temperature frequently.

Have the person sit or lie in a comfortable position with a pillow behind head and shoulders.

If emergency assistance has not been summoned, obtain help now.

If temperature begins to rise again repeat the cooling process

Figure 4.2

Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

Individuals with a history of cold injuries (i.e., frostbite) have a higher-than-normal risk of recurrence, not necessarily involving the part previously injured. Individuals with prior cold injuries should notify the Health and Safety Officer and use the "buddy" system to monitor early detection of cold injury symptoms.

Table 4.2 - Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[1]

Temperature	Normal Work Ensemble[2]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minute work period	After each 15 minutes work period
87.5-90°F (30.8-32.2°C)	After each 60 minutes work period	After each 30 minutes work period
82.5-87.5°F (28.1-30.8°C)	After each 90 minutes work period	After each 60 minutes work period
77.5-82.5°F (25.3-28.1°C)	After each 90 minutes work period	After each 90 minutes work period
72.5-77.5°F (22.5-25.3°C)	After each 150 minutes work period	After each 120 minutes work period

[1] For moderate work, e.g. walking about with moderate lifting and pushing.
[2] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

Noise

The field team may be exposed to excessive noise levels if vehicles or industrial equipment is operating at the site. Therefore, hearing protection will be available for use as appropriate.

Snake Hazards

It is likely that snakes may be encountered at the site. However, long pants and high boots or snake guards will be worn during site activities to avoid a snake hazard. Never reach into a bushy area before checking for snakes by probing the area with a stick and listening for movement in the brush. Workers will use caution when working in areas where snakes may be present.

If a worker is bitten by a poisonous snake, the following steps should be taken:

- Attempt to identify the type of snake and its location,
- Keep the victim calm and minimize movement,
- Apply ice to the area bitten, and
- Transport victim to the nearest medical facility.

SAFE WORK PRACTICES

To ensure a strong safety awareness program during the sampling inspection, personnel must have adequate training. The Health and Safety Plan must be read by each member of the field team before conducting field activities and briefed to the field team at the beginning of each sampling day. A safety awareness must be developed and communicated to all members of the field team. All members of the field team will adhere to the following safety requirements while conducting field work for this sampling effort:

- No smoking, eating, or drinking carbonated beverages while at the site.
- Do not carry matches, lighters, or other ignition sources on the site.
- Facial hair will not be allowed where respirators contact the face.
- Contact lenses will not be worn during field work.
- Alcoholic beverages will not be permitted in state vehicles.
- Always use the "buddy" system while performing field work.

- Avoid walking through puddles or stained soil.
- Discovery of unusual or unexpected conditions will result in immediate evaluation and reassessment of site conditions and health and safety practices.
- A safety briefing will be performed each day prior to on-site work beginning.
- Other safety meetings may be conducted, as necessary.
- Take precautions to reduce injuries from field equipment and other tools.

All personnel will check their equipment at least two weeks before going into the field in case replacements are necessary. For respirator users, the correct corresponding cartridge or canister for the user's respirator will be verified before entering the site.

Tyvek coveralls, neoprene or nitrile gloves, hard hats, and rubber steel-toed boots or steel-toed shoes or boots will be worn by all personnel performing sampling activities. (Tyvek is optional if plastic sheeting is used to kneel on during soil sampling.) Safety glasses/sunglasses will be worn at all times to prevent eye irritation from particulate.

Ground water sample sampling is not planned unless ground water wells are identified during the off-site reconnaissance. If a ground water sampling event does occur, care will be taken to avoid direct contact with the water purged or sampled from these wells. Splash protection for use during well sampling will be available, as needed.

SECTION 5

PERSONNEL PROTECTION EQUIPMENT AND MONITORING

RESPIRATORY PROTECTION

The chemicals that may be present at the site are listed in Section 2, List of Chemicals Used On Site. Visual inspection will be used to detect the presence of any remaining chemicals by noting stained or vegetation stressed areas during the initial walk through. As a final precaution, during the sample collection efforts, warning symptoms such as headaches and nausea and observations of unusual vapors, mists, or clouds, will require using readily available respiratory protective equipment or immediate evacuation of the area.

PERSONAL PROTECTION

The required personal protection clothing will be worn during on-site inspections, especially during all sampling events, except where down-grades are acceptable:

Level D (Modified)

- Coveralls (i.e., tyvek), neoprene, PVC, or rubber boots (steel toe), inner vinyl or latex surgical gloves, outer neoprene work gloves, full-face respirator with organic and particulate filters, and a hard hat.

- Coveralls will be taped at wrists and ankles. Respirator cartridges to be used will bear NIOSH/MSHA approvals. Respirator cartridges will be changed once daily or when recommended exposure is reached to minimize the potential for break-through. If break-through occurs, cartridges must be changed.

If a down-grade is deemed acceptable:

Level D

- Tyvek (non-chemical resistant) coveralls, neoprene, PVC, rubber, or leather work boots (steel toe), optional inner vinyl or latex surgical gloves, outer neoprene work glove, optional goggles or face masks, and a hard hat.

MEDICAL SURVEILLANCE

Each field member must be a current participant in the TRNCC Health Monitoring Program, and must have already had their initial physical examination prior to entering this or any site where a potential exists for exposure to hazardous chemicals.

Each team member will acknowledge that they have had a current annual physical by signature on the Plan Acceptance Form and that they are medically fit to perform team tasks as assigned. If there are any medical restrictions on a team member's utilization, these restrictions must be provided in writing to the Site Safety Officer as noted by a physician as soon as possible before the field work begins. These restrictions will be complied with at all times while performing team tasks. If the team member cannot perform the task as required, another team member will be selected to perform the task.

SITE SPECIFIC TRAINING

The Site Safety Officer will be responsible for developing a hazard awareness briefing for all TNRCC personnel that are to perform team member tasks on the site, and other visiting personnel, as necessary. A Health and Safety Checklist is presented in Appendix B. If other personnel visit the site during the sampling inspection and wish to participate, they will be required to review the Health and Safety Plan and/or receive a hazard awareness briefing from the Site Safety Officer before entering the site. This training will be acknowledged by signature of the visiting personnel on the Plan Acceptance Form (Appendix A). A daily safety meeting will be held prior to entering the site each day and a Site Safety Briefing Form completed (See Appendix C). The safety meeting will consist of the following topics:

SITE SAFETY BRIEFING (Held Each Day)

- Roll call - identify the team member responsible for site safety and health. Assure the Plan Acceptance Form has been signed by each team member.
- Discuss safety, health, and other issues that may effect the tasks assigned.
- Discuss/review proper use of personal protective equipment.
- Review work practices by which the employee can minimize risk from hazards.
- Discuss safe operation of engineering controls and equipment used on the site.
- Review potential chemicals and acute effects of the chemicals at the site.
- Review evacuation routes, signals, and emergency evacuation procedures.
- Review decontamination procedures, assign decontamination tasks.
- Assign designated area to meet in case work area must be evacuated.
- Review "buddy" system procedures.

Each team member will acknowledge that they have had a current annual physical by signature on the Plan Acceptance Form and that they are medically fit to perform team tasks as assigned. If there are any medical restrictions on a team member's utilization, these restrictions must be provided in writing to the Site Safety Officer as noted by a physician as soon as possible before the field work begins. These restrictions will be complied with at all times while performing team tasks. If the team member cannot perform the task as required, another team member will be selected to perform the task.

SITE SPECIFIC TRAINING

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SITE SAFETY BRIEFING (Held Each Day)

- Roll call - identify the team member responsible for site safety and health. Assure the Plan Acceptance Form has been signed by each team member.
- Discuss safety, health, and other issues that may effect the tasks assigned.
- Discuss/review proper use of personal protective equipment.
- Review work practices by which the employee can minimize risk from hazards.
- Discuss safe operation of engineering controls and equipment used on the site.
- Review potential chemicals and acute effects of the chemicals at the site.
- Review evacuation routes, signals, and emergency evacuation procedures.
- Review decontamination procedures, assign decontamination tasks.
- Assign designated area to meet in case work area must be evacuated.
- Review "buddy" system procedures.

SECTION 6

FREQUENCY AND TYPES OF AIR MONITORING

Air monitoring will not be conducted during the sampling event at theTVI site. The primary contaminants of concern includes solid inorganic catalyst material. Additional unknown contaminants may be present and all personnel must be aware of the potential for a release to the air.

AIR MONITORING EQUIPMENT CALIBRATION AND MAINTENANCE

No air monitoring equipment will be utilized during the sampling event at the TVI site.

SECTION 7

ACCIDENT PREVENTION AND CONTINGENCY PLAN

ACCIDENT PREVENTION

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before beginning the site investigation, a meeting will be held to discuss accident prevention (see Section 5, Site Safety Briefing). The discussion should cover but not be limited to:

- Tasks to be performed; time constraints (e.g., rest breaks);
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals; and emergency medical procedures.
- Emergency evacuation procedures.

Buddy System

The "buddy" system will be used at all times by all TNRCC field personnel while performing work related tasks on site. All activities must be conducted with a partner (buddy) who can:

- Provide his or her partner with assistance;
- Observe his or her partner for signs of chemical or weather exposure; and
- Notify the Site Safety Officer or others if emergency help is needed.

CONTINGENCY PLAN

Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site, or

- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should then notify the Site Safety Officer of the chemical exposure. The Site Investigation Manager should contact the appropriate emergency response agency.

- If the chemical is on the individual's clothing, the chemical should be neutralized or removed (if it is safe to do so).

- If the chemical has contacted the skin, the skin should be washed immediately with copious amounts of water.

- In case of eye contact, the emergency eye-wash solution should be used. Eyes should be washed for at least 15 minutes using available distilled water.

- All chemical exposure incidents must be reported to the Region/Central Office Staff Safety Offices. The Site Investigation Manager is responsible for reporting the chemical exposure incident and assist the individual's supervisor in submitting a written report (see Appendix A).

Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- A team member should signal the other team member that an injury has occurred.

- A field team member trained in first aid can administer immediate treatment to the injury.

- The victim should then be transported (if applicable) to the nearest hospital or medical center, or stabilized so that further injury does not occur.

- The Site Investigation Manager is responsible for completion and submittal of an accident report form to the Region and Central Office Staff Safety Offices. The situation which caused the accident should immediately be corrected.

Evacuation Procedures

- The Site Safety Officer will determine whether an evacuation is necessary.
- All personnel in the work area should evacuate the area and meet in the predesignated area.
- Account for all personnel. Wait for further instructions from the Site Safety Officer.

SECTION 8

SITE-SPECIFIC DECONTAMINATION PROCEDURES

Prior to leaving the site, personnel protective and sampling equipment will be decontaminated. Decontamination procedures will be conducted as follows:

- Remove and wash goggles or safety glasses (if used),
- Remove and wash chemical protective boots, gloves,
- Wash sampling equipment to remove gross contamination, and
- Wash hands and face.

Protective gloves will be placed in garbage bags and disposed of appropriately at the conclusion of site activities. Sampling equipment will be placed in plastic bags for final decontamination at the conclusion of site activities.

PERSONNEL DECONTAMINATION PROCEDURES

The TNRCC field team will establish an on-site decontamination station. An area will be set up during initial field activities prior to any sampling event. The decontamination station will have provisions for collecting disposable protective equipment; for washing boots, gloves, field instruments, sampling tools (if required); and for washing hands, face, and other exposed body parts. Investigation derived waste (IDW) from decontamination will be properly disposed in accordance with EPA guidelines outlined in the EPA/540/G-91/009, May 1991 handbook.

Decontamination equipment will include, as necessary:

- Plastic buckets, pails, and scrub brushes
- Non-phosphate detergent
- Isopropyl alcohol
- Paper towels
- Plastic garbage bags, sheets of plastic
- Deionized and potable water.

SECTION 9

DOCUMENTATION AND NOTIFICATION

LOGBOOK DOCUMENTATION REQUIREMENTS

Implementation of the provisions of the Health and Safety Plan will be recorded in the field log book. Information to be recorded shall include:

- Weather conditions at the time of the inspection (daily entry),
- Names of the personnel on-site (daily entry),
- Levels of personal protective equipment worn by the field personnel (specifically note conditions or rational for down- or up-grading PPE),
- Subjects discussed during site health and safety briefings, and
- All safety violations.

A Health and Safety Checklist has been included in Appendix C to assist the Site Safety Officer in assuring that appropriate safety consideration have been covered in the daily safety briefing.

EPA NOTIFICATION OF IMMINENT DANGER TO THE GENERAL PUBLIC

If there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes, which are readily accessible on-site, the Site Investigation Manager will notify the Project Manager who will notify the EPA no later than one (1) day after the inspection team returns from the site. Written notification will follow any verbal communication in regard.

SECTION 10

CONFINED SPACE ENTRY

A "Confined Space" means that a space:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;
2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
3) is not designed for continuous employee occupancy.

Should confined spaces be required to be inspected for a SSI, the Site Project Manager will be responsible for evaluating the site to determine if any confined spaces meet the definition of a permit-required confined space. "Permit-required confined space" means a confined space that has one or more of the following characteristics:

1) contains or has a potential to contain a hazardous atmosphere;
2) contains material that has the potential for engulfing an entrant;
3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4) contains any other recognized serious safety or health hazard.

If permit-required confined spaces are observed on site and are required to be investigated, the Sit Project Manager, or any other team member, will not enter these spaces and will notify the Staff Health and Safety Officer, who will arrange for certified personnel who can work in permit-required confined spaces.

APPENDIX A

PLAN ACCEPTANCE FORM

SUMMARY OF ACTIVITIES

ACCEPTANCE

I have read the Health and Safety plan (or been briefed on the hazards) for Screening Site Inspection (SSI) field work to be conducted at the Trinity Valley Iron Site located in Tarrant County, Texas, and agree to abide by the rules and guidelines contained therein. I acknowledge that I have had a current annual physical within the last 12-month period from the date signed below, and am medically cleared to perform my tasks as outlined.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

AUSTIN TEXAS

MEMORANDUM

RECEIVED

OCT 27 1993

TO: All TNRCC SUPERVISORS

FROM: Walter E. Keith WEK
Workers' Compensation Claims Coordinator

DATE: August 6, 1993

SUBJECT: Reporting Procedures For Workers' Compensation Claims

All TNRCC employees are encouraged to report any accident to their supervisor immediately. Accidents involving an "on-the-job" injury resulting in a medical expense and/or lost time must be reported. In the absence of an immediate supervisor, employees should report to the person left in charge or someone else in a supervisory capacity.

The supervisor upon being informed of an employee injury should immediately contact Walter E. Keith, Workers' Compensation Claims Coordinator for the agency, by calling 512/908-1819. Follow-up correspondence such as witness statements should be sent to the Workers' Compensation Claims Coordinator at 12124 Park 35 Circle, Austin, TX 78753 either by fax 512/908-1212 or by mail.

All Employee injuries involving lost time or medical payment must be reported to the State Employees Division of the Attorney General's Office followed by the necessary paperwork within two calendar days.

Supervisors should pay particular attention to the TWCC 1S form attached. You will be required to supply much of the information for the completion of this form. Please be prepared to communicate telephonically the information to satisfy items 1 through 33. I will supply data to satisfy items 34 through 51.

It is important that supervisors are aware of the following:

(a) Item 9 - Mailing Address: Home address of the injured employee. You must include the COUNTY.
(b) Item 30 - Date of Hire: Agency hire-in date of employee.
(c) Item 33 - Length of Service in Occupation: Time indicated may differ with the date of hire.

Please note that recent staff reorganizations have shifted the Workers' Compensation function from the Human Resources Division to the Risk Management Section. As we all adjust to this change, I want you to know that I appreciate your interest and concern to help make our Workers' Compensation Claim Procedures operate smoothly. Our ultimate goal is to have NO workers' compensation claims to process, if and/or when the occasion does arise, I look forward to working with you. Thank you and please do not hesitate to call me if you have any questions.

ATTACHMENT

Mail this form to:
OFFICE OF THE ATTORNEY GENERAL
Workers' Compensation Division
P. O. Box 13777
Austin, Texas 78711

Please read instruction sheet CAREFULLY, giving special attention to items marked with an asterisk (*)

TWCC CLAIM # _____

DIRECTOR'S # _____

EMPLOYER'S FIRST REPORT OF INJURY OR ILLNESS

1. Name (Last, First, M.I.)
2. Sex F ☐ M ☐
3. Social Security Number - -
4. Home Phone ( )
5. Date of birth (m-d-y) - -
6. Does the Employee Speak English? If No, Specify Language
YES ☐ NO ☐ WORK PHONE ( ) -
7. Race White ☐ Black ☐ Asian ☐
8. Ethnicity Hispanic ☐ Other ☐ Native American ☐
9. Mailing Address
Street or P.O. Box
City State ZIP Code County
10. Marital Status
Married ☐ Widowed ☐ Separated ☐ Single ☐ Divorced ☐
11. Number of Dependent Children
12. Spouse's Name
13. Doctor's Name
14. Doctor's Mailing Address (Street or P.O. Box)
City State ZIP Code
DR'S PHONE # ( ) -

15. Date of Injury (m-d-y) - -
16. Time of Injury : am ☐ pm ☐
17. Date Lost Time Began (m-d-y) - -
18. Nature of Injury*
19. Part of Body Injured or Exposed*
20. How and Why Accident/Injury Occurred*
21. Was employee doing his regular job? YES ☐ NO ☐
22. Worksite Location of Injury (plant, dock, etc.)*
23. Address Where Injury or Exposure Occurred
Name of business if incident occurred on a business site
Street or P.O. Box County
City State ZIP Code
24. Cause of Injury (fall, tool, machine, etc.)*
25. List Witnesses
26. Return to work date/or expected (m-d-y) - -
27. Did employee die? YES ☐ NO ☐
28. Supervisor's Name
29. Date reported (m-d-y) - -

30. Date of Hire (m-d-y) - -
31. Was employee hired or recruited in Texas? YES ☐ NO ☐
32. Length of Service in Current Position Months _____ Years _____
33. Length of Service in Occupation Months _____ Years _____
34. State Payroll Classification Code
35. Occupation of Injured Worker
36. Rate of Pay at this Job
$ _____ Hourly
$ _____ Weekly
$ _____ Monthly
37. Full Work Week is: _____ Hours _____ Days
38. Last Paycheck was: $ _____
39. Is employee an Owner, Partner, or Corporate Officer? YES ☐ NO ☒

40. Name and Title of Person Completing Form
Claim Coordinator
41. Name of Agency
42. Agency Mailing Address and Telephone Number
Street or P.O. Box Telephone ( )
City State ZIP Code
43. Agency Location (If different from mailing address)
Number and Street
City State ZIP Code
44. Federal Tax Identification Number - 9998
45. Primary Standard Industrial Classification Code (SIC)* (4 digit)
46. Specific SIC Code* (4 digit)
47. Comptroller Agency Code
48. Workers' Compensation Insurance Company
State Employee's Division, Attorney General's Office
49. Policy Number
TXSTATEPOL0001
50. Did you request accident prevention services in past 12 months? YES ☐ NO ☐ If yes, did you receive them? YES ☐ NO ☐
52. Number of Hours of Sick Leave Credited to Employee on Date of Injury

Signature and Title (READ INSTRUCTIONS ON INSTRUCTION SHEET BEFORE SIGNING)

X _____ Claim Coordinator Date _____

RISK MANAGEMENT

TACB SUPPLEMENTAL INSTRUCTIONS FOR COMPLETION TWC FORM TWCC-121

Supervisor's Investigation of Employee's Accident/Incident

1. All thirteen (13) blocks in the heading must be completed. To assist in this area, note the following:

Block	Instructions
7. Date of Employment in Unit	Use date employee arrived in your work section. (This date may differ from date of employment with the Agency.)
8. Agency Number	a) For TACB, this number is 519 b) For TWC, this number is 582
9. Budget Number of Assigned Unit	This is a four-digit budget number (program activity) that, if not known, can be found by contacting your budget office or by looking at the employee's monthly earnings statement. On that statement, the budget number is the first four (4) digits to the right of the employee's name.
10. Job Classification Code	This may be alpha-numeric (a letter and 3 numbers), but it is usually a four-digit number established by the State Auditor's Office. For example, an Occupational Safety Manager I has a Job Classification Code of 2752. As a last resort, this number may be obtained from the Personnel Office.

2. Be meticulous when completing Blocks A - N. Data is intended at all levels for Accident Prevention Analysis (not disciplinary action).

3. Supervisors are expected to conduct the investigation and to complete Blocks A-N on the form. ADSOs can assist, but should not be tasked to do the investigation.

4. Once the TWCC-121 is filled out through Block P. 2, the completed form is sent through distribution to the Agency Risk Manager and not inadvertently forwarded to the Texas Workers' Compensation Commission.

5. Form should be locally reproduced as needed.

6. Questions concerning this form and its use should be addressed to the Agency Risk Manager and Safety Director at (512) 908-1913 (TXAN: 247-1913).

SUPERVISOR'S INVESTIGATION OF EMPLOYEE'S ACCIDENT/INCIDENT

1. LAST NAME OF INJURED	2. FIRST NAME	3. M.I.	4. SOCIAL SECURITY NUMBER - -	5. DATE OF BIRTH / /
6. SEX M ☐ F ☐	7. DATE OF EMPLOYMENT IN UNIT / /	8. AGENCY NUMBER (COMPTROLLER'S CODE)	9. BUDGET NUMBER OF ASSIGNED UNIT	
10. JOB CLASSIFICATION CODE	11. POSITION STATUS ☐ Full-time ☐ Part-time ☐ Floater (fills where needed)		12. DATE OF INCIDENT / /	13. TIME OF INCIDENT : a.m. ☐ p.m. ☐

A. EXTENT OF INJURY (Check one only)

- ☐ 01 No injury (incident only)
- ☐ 02 Injury not requiring a TWCC-1
- ☐ 03 Medical
- ☐ 04 Lost time only (more than one day)
- ☐ 05 Medical and lost time
- ☐ 06 Fatality

B. CATEGORY (Check one only)

- ☐ 01 Occupational injury (accident)
- ☐ 02 Occupational injury (aggressive behavior)
- ☐ 03 Occupational illness/disease

C. SPECIFIC LOCATION OF OCCURRENCE (Check one only)

INDOORS:
BUILDING INVENTORY NO. _____

- ☐ 01 Auditorium
- ☐ 02 Bath/Toilet area
- ☐ 03 Boiler room
- ☐ 04 Canteen/Snack bar
- ☐ 05 Cell block
- ☐ 06 Classroom
- ☐ 07 Closet
- ☐ 08 Day room
- ☐ 09 Dormitory/Living room
- ☐ 10 Elevator
- ☐ 11 Food service area/Dining/Kitchen
- ☐ 12 Garage
- ☐ 13 Gymnasium/Recreation
- ☐ 14 Hallway/Corridor
- ☐ 15 Hospital/Clinic/Dispensary
- ☐ 16 Laboratory
- ☐ 17 Laundry
- ☐ 18 Library
- ☐ 19 Nursing station
- ☐ 20 Office areas
- ☐ 21 Program areas
- ☐ 22 Ramp
- ☐ 23 Sales store/Outlet
- ☐ 24 Seclusion room
- ☐ 25 Sleeping room
- ☐ 26 Steps/Stairs/Stairway
- ☐ 27 Storage area
- ☐ 28 Waiting room
- ☐ 29 Workshop/Technical trades
- ☐ 30 Other (specify) _____

OUTDOORS:

- ☐ 31 Athletic field
- ☐ 32 Campus
- ☐ 33 Grounds
- ☐ 34 Highway/Road/Street
- ☐ 35 Loading dock
- ☐ 36 Park or recreation area
- ☐ 37 Parking lot
- ☐ 38 Roof
- ☐ 39 Sidewalk
- ☐ 40 Steps/Stairs/Stairway
- ☐ 41 Storage area
- ☐ 42 Swimming pool area
- ☐ 43 Tower
- ☐ 44 Other (specify) _____

D. ACTIVITY ENGAGED IN BY INJURED AT TIME OF INJURY (Check one only)

- ☐ 01 Bathing
- ☐ 02 Buffing
- ☐ 03 Carrying
- ☐ 04 Cleaning
- ☐ 05 Climbing
- ☐ 06 Coming
- ☐ 07 Descending
- ☐ 08 Digging
- ☐ 09 Dressing
- ☐ 10 Driving
- ☐ 11 Eating
- ☐ 12 Escorting
- ☐ 13 Exercising
- ☐ 14 Feeding
- ☐ 15 Grinding
- ☐ 16 Grooming
- ☐ 17 Jumping
- ☐ 18 Lifting
- ☐ 19 Loading
- ☐ 20 Mopping
- ☐ 21 Moving
- ☐ 22 Opening
- ☐ 23 Pulling
- ☐ 24 Pushing
- ☐ 25 Reaching
- ☐ 26 Redirecting
- ☐ 27 Restraining
- ☐ 28 Running
- ☐ 29 Sanding
- ☐ 30 Sawing
- ☐ 31 Searching
- ☐ 32 Securing
- ☐ 33 Sitting
- ☐ 34 Standing
- ☐ 35 Stepping
- ☐ 36 Turning
- ☐ 37 Walking
- ☐ 38 Welding
- ☐ 39 Other (specify) _____

E. BODY PART INJURED (Most serious)

- ☐ 01 Ankle
- ☐ 02 Arm
- ☐ 03 Back
- ☐ 04 Buttocks
- ☐ 05 Cheek
- ☐ 06 Chest
- ☐ 07 Chin
- ☐ 08 Ear(s)
- ☐ 09 Eye(s)
- ☐ 10 Foot-Feet
- ☐ 11 Finger/Thumb(s)
- ☐ 12 Forehead
- ☐ 13 Groin
- ☐ 14 Hand
- ☐ 15 Hips
- ☐ 16 Internal organs
- ☐ 17 Jaw
- ☐ 18 Knee(s)
- ☐ 19 Leg(s)
- ☐ 20 Mouth
- ☐ 21 Neck
- ☐ 22 Nose
- ☐ 23 Pelvis
- ☐ 24 Rib(s)
- ☐ 25 Scalp
- ☐ 26 Shoulder
- ☐ 27 Toe(s)
- ☐ 28 Wrist(s)
- ☐ 29 Other (specify) _____

F. TYPE OF INJURY (Check primary one)

- ☐ 01 Abrasion
- ☐ 02 Amputation
- ☐ 03 Bite
- ☐ 04 Bruise
- ☐ 05 Burn
- ☐ 06 Concussion
- ☐ 07 Cut
- ☐ 08 Dermatitis
- ☐ 09 Dislocation
- ☐ 10 Foreign object
- ☐ 11 Fracture
- ☐ 12 Frostbite
- ☐ 13 Hearing loss
- ☐ 14 Heart attack
- ☐ 15 Heat exhaustion
- ☐ 16 Hernia
- ☐ 17 Infection
- ☐ 18 Inflammation
- ☐ 19 Internal injuries
- ☐ 20 Puncture
- ☐ 21 Rupture
- ☐ 22 Scratch
- ☐ 23 Shock
- ☐ 24 Sprain
- ☐ 25 Sting
- ☐ 26 Strain
- ☐ 27 Other (specify) _____

G. TYPE OF OCCURRENCE (Check one only)

- ☐ 01 Aggression (client, student, inmate, patient)
- ☐ 02 Bodily reaction (drug, medication)
- ☐ 03 Caught in, on, under, or between
- ☐ 04 Contact with chemicals
- ☐ 05 Contact with electric current
- ☐ 06 Contact with temperature extremes
- ☐ 07 Fall on same level
- ☐ 08 Fall on different level
- ☐ 09 Over-exertion (exceeding physical ability resulting in strain, rupture)
- ☐ 10 Overexposure to environmental hazards (noise, toxic)
- ☐ 11 Slip (not a fall)
- ☐ 12 Struck against (rough, sharp object)
- ☐ 13 Struck by falling, moving object
- ☐ 14 Other (specify) _____

H. PHYSICAL THING MOST CLOSELY ASSOCIATED WITH OCCURRENCE (Check one)

- ☐ 01 Aircraft
- ☐ 02 Air pressure
- ☐ 03 Animal (snake, dog, horse, etc.)
- ☐ 04 Athletic equipment (baseball, bat, dart, etc.)
- ☐ 05 Attachments (belt, pulley, gear, shaft)
- ☐ 06 Building component
- ☐ 07 Cabinet
- ☐ 08 Chemical (solid, liquid, or gas)
- ☐ 09 Clothing
- ☐ 10 Container (bottle, box, barrel, cylinder, etc.)
- ☐ 11 Curb
- ☐ 12 Doors (automatic, manual, revolving)
- ☐ 13 Drugs or medicine
- ☐ 14 Dust
- ☐ 15 Electrical apparatus
- ☐ 16 Elevator, escalator
- ☐ 17 Explosives
- ☐ 18 Eyewear
- ☐ 19 Fan
- ☐ 20 Fire, flame, smoke
- ☐ 21 Floor
- ☐ 22 Food products
- ☐ 23 Fumes
- ☐ 24 Furniture, fixtures
- ☐ 25 Gas
- ☐ 26 Glass items
- ☐ 27 Gun
- ☐ 28 Ground (earth)
- ☐ 29 Hand tool
- ☐ 30 Heating equipment
- ☐ 31 Hoisting equipment
- ☐ 32 Icy condition
- ☐ 33 Infectious or parasitic agent
- ☐ 34 Inmate, client, employee
- ☐ 35 Insect
- ☐ 36 Kitchen equipment
- ☐ 37 Knife
- ☐ 38 Lighting fixture and equipment
- ☐ 39 Ladder, scaffold
- ☐ 40 Locker
- ☐ 41 Machine
- ☐ 42 Material handling equipment
- ☐ 43 Metal
- ☐ 44 Mineral items (asphalt, clay, gravel, etc.)
- ☐ 45 Motor vehicle
- ☐ 46 Needle
- ☐ 47 Office equipment (chair, desk, cabinet, etc.)
- ☐ 48 Paint
- ☐ 49 Particle
- ☐ 50 Pavement
- ☐ 51 Person (other than client, inmate, employee)
- ☐ 52 Pipe
- ☐ 53 Platform, dock, ramp

H. CONTINUED

- ☐ 54 Pole
- ☐ 55 Power tool or machinery (lathe, saw, etc.)
- ☐ 56 Radiating equipment (microwave, x ray, etc.)
- ☐ 57 Receptacle
- ☐ 58 Smoke
- ☐ 59 Stair, step
- ☐ 60 Sun
- ☐ 61 Trench/Ditch
- ☐ 62 Vegetation
- ☐ 63 Weather
- ☐ 64 Wood
- ☐ 65 Other (specify) _____

I. ACT/PRACTICE ASSOCIATED WITH OCCURRENCE (Check one only)

- ☐ 01 Contact with electrical source (tool, device, wire, etc.)
- ☐ 02 Entering an unauthorized area
- ☐ 03 Failure to practice safe driving technique
- ☐ 04 Failure to use established route or taking short cut
- ☐ 05 Failure to use handrail, grab bar
- ☐ 06 Failure to use lockout device
- ☐ 07 Failure to use/wear personal protective equipment (PPE)
- ☐ 08 Failure to warn of known hazards (i.e. no safety sign, light, barricade, instruction, etc.)
- ☐ 09 Failure to wear appropriate dress (shoes, shirt, blouse)
- ☐ 10 Handling (of object, material, item, thing)
- ☐ 11 Horseplay
- ☐ 12 Improper mixing or storing (non-compatible material, chemicals, etc.)
- ☐ 13 Improper placing or storing (materials, tools, equipment)
- ☐ 14 Lifting (including position, stance)
- ☐ 15 Making safety devices inoperative
- ☐ 16 No unsafe act/practice on the part of employee
- ☐ 17 Operating/Working at unsafe speed
- ☐ 18 Operating without proper authority/clearance
- ☐ 19 Over or unnecessary exposure to hazards (gas, fumes, dust, chemicals, mist, radiation, etc.)
- ☐ 20 Repairing or servicing moving object/thing (machine, equipment, etc.)

I CONTINUED

- ☐ 21 Riding moving equipment not designed for passengers
- ☐ 22 Unobserved (daydreaming, inattentive, etc.)
- ☐ 23 Using unsafe/defective tool, material, equipment
- ☐ 24 Using wrong tool, material, equipment
- ☐ 25 Working/Walking under suspended load (crane, hoist, derrick)
- ☐ 26 Working in a confined space without proper safeguard
- ☐ 27 Working without adequate lighting
- ☐ 28 Other (specify) _____

J. CONDITION (PHYSICAL HAZARD) ASSOCIATED WITH OCCURRENCE (Check one)

- ☐ 01 Congested area
- ☐ 02 Electrical hazard (uninsulated wire, overloaded circuit, inadequate ground, etc.)
- ☐ 03 Excessive noise
- ☐ 04 Harmful animals/insects/reptiles
- ☐ 05 Health hazards (radiation, gas, fumes, dust, vapors, etc.)
- ☐ 06 Improper housekeeping
- ☐ 07 Improperly stored chemicals, hazardous substances
- ☐ 08 Inadequate ventilation
- ☐ 09 Inadequate or no warning signs
- ☐ 10 Layout or design (office, shop, equipment)
- ☐ 11 Lighting
- ☐ 12 Mislabeled/Unlabeled chemicals, hazardous materials, etc.
- ☐ 13 No unsafe condition
- ☐ 14 Open trench, hole, ditch, sharp drop-off
- ☐ 15 Poisonous vegetation (oak, ivy, etc.)
- ☐ 16 Protruding object (nail, wire, splinter, etc.)
- ☐ 17 Rough/Sharp objects
- ☐ 18 Slipping or tripping hazard
- ☐ 19 Step, stair, ladder, or other working surfaces
- ☐ 20 Unguarded machine, belt, pulley, roller, etc.

J CONTINUED

- ☐ 21 Unsafe/Defective hand or electric tools
- ☐ 22 Unsafe equipment
- ☐ 23 Unsafe material
- ☐ 24 Unsafe vehicle
- ☐ 25 Unshored trench, excavation, etc.
- ☐ 26 Walkway, sidewalk, pavement
- ☐ 27 Other (specify) _____

K. DID THE STATE OR THE UNIT HAVE A SAFETY RULE, REGULATION, OR STANDARD THAT WOULD HAVE PREVENTED THE OCCURRENCE?

☐ 01 Yes ☐ 02 No

L. WAS THE RULE, REGULATION, OR STANDARD VIOLATED?

☐ 01 Yes ☐ 02 No

M. ACTION(S) TAKEN OR PLANNED TO PREVENT RECURRENCE (Check all that apply)

- ☐ 01 Action taken with employee for violating rules, regulations or procedures
- ☐ 02 All employees were made aware of the occurrence cause, consequence, and action to prevent recurrence
- ☐ 03 Employee given basic training
- ☐ 04 Employee given refresher or remedial training
- ☐ 05 Existing rule, regulation or standard (SOP) enforced
- ☐ 06 Existing rule, regulation or standard (SOP) revised
- ☐ 07 New rule, regulation or standard prepared
- ☐ 08 Physical hazard(s) corrected
- ☐ 09 Other positive action taken _____

N. DESCRIBE BRIEFLY IN NARRATIVE FORM THE CIRCUMSTANCES THAT LED TO AND CAUSED THIS OCCURRENCE.

ANSWER: WHO? WHAT? WHERE? WHEN? WHY? AND HOW? (Use additional sheet if necessary)

		/ /	( )
INJURED'S IMMEDIATE SUPERVISOR (print)	SIGNATURE	DATE	PHONE

P. REVIEWED BY

P.1 SECTION/DEPARTMENT/DIVISION ADDITIONAL DUTY SAFETY OFFICER, COMMENT:

		/ /
	SIGNATURE	DATE

P.2 SECTION/DEPARTMENT/DIVISION HEAD, COMMENT:

		/ /
	SIGNATURE	DATE

P.3 AGENCY OR FACILITY SAFETY MANAGER

A) Repeat occurrence: ☐ 01 No ☐ 02 Yes, total incidents: ☐ 03 Two ☐ 04 Three ☐ 05 Four ☐ 06 Five ☐ 07 Over

B) Were three (3) or more workers injured in this accident? (If so, complete a separate form for each employee) ☐ 01 Yes ☐ 02 No

C) Comment

/ /

APPENDIX B

HEALTH AND SAFETY CHECKLIST

_	1.	Conduct safety briefing (each day).
_	2.	Conduct initial site survey (first day).
_	3.	Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.
_	4.	Copy of HASP.
_	5.	First aid and snakebite kits, including ice.
NA	6.	Calibrated air monitoring devices.
_	7.	Water.
_	8.	Emergency contact list and map to hospital (or mark in HASP).
_	9.	Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)
_	10.	Copy of SSI Workplan.

APPENDIX C

SITE SAFETY BRIEFING

Job Number (Site) _____ Number TXD_____
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____
_____Protective Clothing/Equipment
_____
_____
Physical Hazards _____
_____Control Methods _____
_____
_____Chemical Hazards _____
_____
_____Decontamination Procedures/Tasks _____
_____
Evacuation Procedures/Route/Signals _____
_____Evacuation Meeting Area ___
_____
Nearest Phone _____
Hospital Name/Address _____
Special Topics (incidents, actions taken, etc.) _____
_____
_____
_____

****

ATTENDEES

Print Name	Sign Name
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting conducted by: _____

SITE SAFETY BRIEFING

Job Number (Site) _____ Number TXD_____
Date _____ Start Time _____ Completed _____
Site Location _____
Type of Work (General) _____
****

SAFETY ISSUES

Tasks (this shift) _____
_____Protective Clothing/Equipment
_____
_____
Physical Hazards _____
_____Control Methods _____
_____
_____Chemical Hazards _____
_____
_____Decontamination Procedures/Tasks _____
_____
Evacuation Procedures/Route/Signals _____
_____Evacuation Meeting Area ___
_____
Nearest Phone _____
Hospital Name/Address _____
Special Topics (incidents, actions taken, etc.) _____
_____
_____
_____

****

ATTENDEES

Print Name	Sign Name
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Meeting conducted by: _____

APPENDIX C

Quality Assurance Project Plan

TNRCC

Protecting Texas
by Reducing and
Preventing Pollution

Quality Assurance Project Plan

for

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site
Inspection Program (FY 1997)

Prepared in cooperation with the
U.S. Environmental Protection
Agency

September 1996

Quality Assurance Project Plan

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site Inspection
Program (FY 1997)

the

U.S. Environmental Protection Agency

September 1996

The preparation of this report was financed through a grant from the U.S. Environmental Protection Agency.

QTRACK # EQ-96-122

QUALITY ASSURANCE PROJECT PLAN
FOR
TNRCC PRELIMINARY ASSESSMENTS AND SCREENING SITE INSPECTIONS

TNRCC Concurrence:

DeAnna L. Epperson — 09/16/96
DeAnna L. Epperson
Superfund Site Discovery and Assessment Program
Quality Assurance Manager — Date

10/1/96
Allan M. Scils
Superfund Site Discovery and Assessment Program
Program Manager — Date

10/1/96
Wesley D. Newberry
Superfund Site Discovery and Assessment Program
Technical Director — Date

10-1-96
David Davis
Pollution Cleanup Division
Division Director — Date

11-26-96
Larry Smith
Field Operations Division
Regional Manager R-11 — Date

12-5-96
John Young
Field Operations Division
Division Director — Date

TNRCC Approval for Implementation:

Steve Stubbs
Compliance Support Division
QA Manager

12/18/96
Date

Joe Vogel
Office of Compliance and Enforcement
Deputy Director

12-16-96
Date

Barry Williams
Office of Waste Management
Deputy Director

12/17/96
Date

Dan Pearson
Texas Natural Resource Conservation Commission
Executive Director

12/19/96
Date

EPA Concurrence:

Bartolomé J. Cañellas
U.S. Environmental Protection Agency, Region 6
Site Assessment Manager for Texas

1/7/97
Date

Susan Webster
U.S. Environmental Protection Agency, Region 6
Site Assessment Team

1/15/97
Date

EPA Approval for Implementation:

for Robert R. Broyles
U.S. Environmental Protection Agency, Region 6
Chief, Site Response Section

1/15/97
Date

TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

FIGURES

TABLES

REFERENCES

Interim Draft EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, May 1994

EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Document No. ILM04.0

USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Revision No. OLM03.1, August, 1994

USEPA National Functional Guidelines for Inorganic Data Review, EPA 540/R-94/013, February 1994.

USEPA National Functional Guidelines for Organic Data Review, EPA 540/R-94/012, February 1994.

QAPP DISTRIBUTION LIST

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Allan M. Seils, Program Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
DeAnna Epperson, QA/QC Program Officer	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
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Vacant Site Investigation Managers	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program

SECTION 1

PROJECT MANAGEMENT

(A4) PROJECT ORGANIZATION and (A6) PROJECT DESCRIPTION

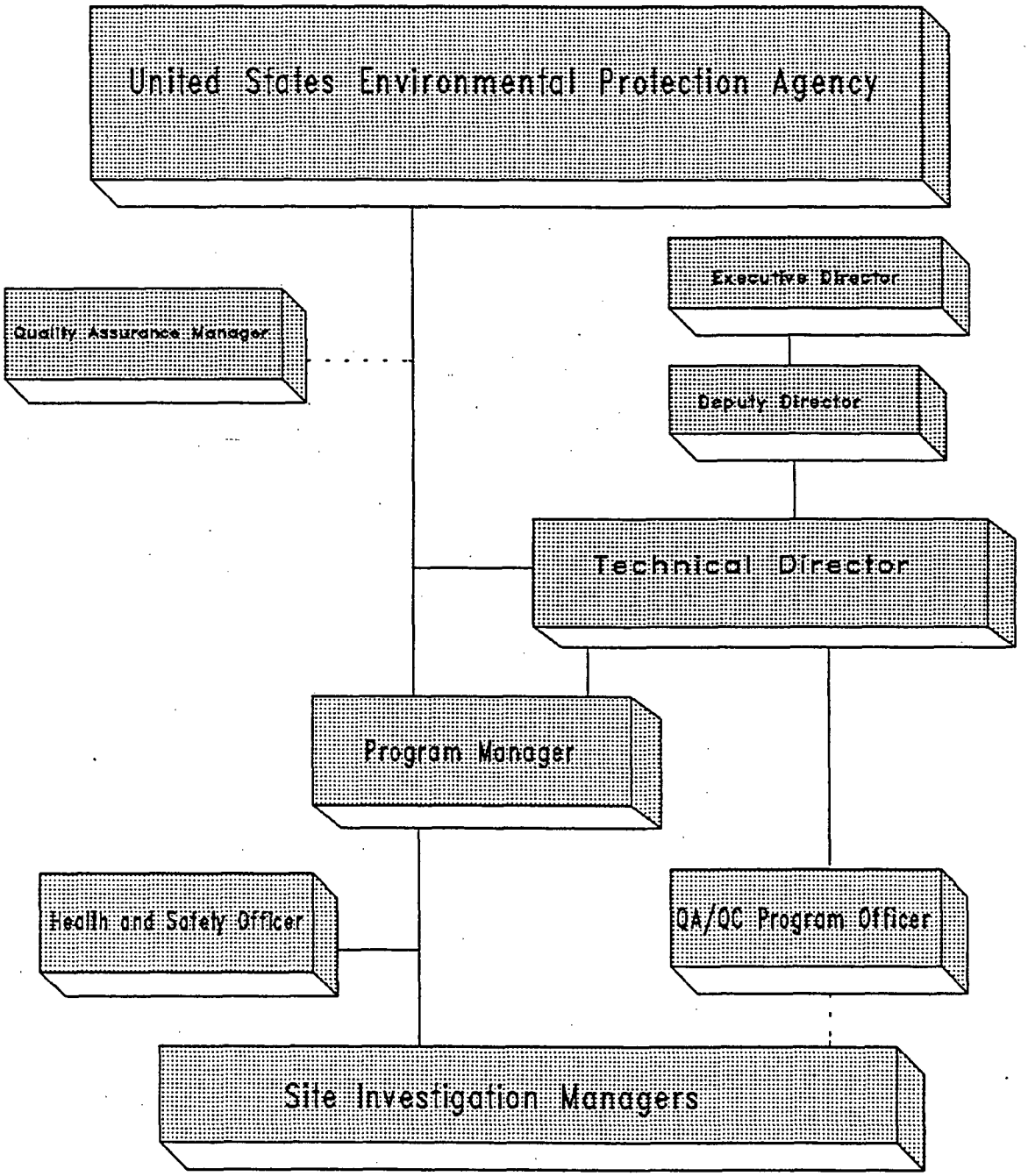
This document is a Quality Assurance Project Plan (QAPP) for the planning and implementation by the Texas Natural Resource Conservation Commission (TNRCC) of Preliminary Assessments and Screening Site Inspections in Texas for the U.S. Environmental Protection Agency (EPA). This QAPP serves as a controlling mechanism to ensure that all data collected are of satisfactory quality. This QAPP has been prepared in accordance with the "Interim Draft EPA Requirements for Quality Assurance Project Plans ", EPA QA/R-5, May 1994, and EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

The TNRCC Site Investigation Manager will be responsible for collecting the samples defined in the Screening Site Inspections (SSI) or Expanded Site Investigation (ESI) Work Plan (WP), initiating the proper chain-of-custody, health and safety, and quality assurance procedures. The TNRCC Site Investigation Manager will also be responsible for making any field sampling determinations as dictated by site conditions. Samples from the sites will be analyzed for semi-volatiles, volatiles, metals, pesticides and Polychlorinated Biphenyls (PCBs).

If, considering site conditions, there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes which are readily accessible on-site, the EPA will be notified no later than one (1) day after the inspection team returns from the site visit. Written notification will follow any verbal communication in this regard.

The Preliminary Assessments and Site Investigation (PA/SI) program organization chart, Figure 1.1, identifies the key individuals who will be primarily responsible for performance of the project. This organizational structure forms a management team of professionals to oversee the technical aspects of the project, supported by an administrative team who will ensure that personnel and equipment are available to the project when required.

Allan M. Seils, will function as TNRCC Program Manager. Mr. Seils will be responsible for overall coordination of project activities. He also will serve as primary TNRCC contact for the EPA. The Technical Director, Wesley G. Newberry, will review the SSI work plans, Preliminary Assessment (PA) and SSI reports, and progress reports. DeAnna Epperson, the Program QA/QC Officer, will be responsible for reviewing data in accordance with the procedures outlined in this


United States Environmental Protection Agency
Executive Director
Quality Assurance Manager
Deputy Director
Technical Director
Program Manager
Health and Safety Officer
QA/QC Program Officer
Site Investigation Managers

QAPP, and will complete associated data assessment reports. The Program QA/QC Officer will function independently of the Program Manager and will assure that project quality control is maintained. The TNRCC Program Quality Assurance/Quality Control (QA/QC) Officer shall audit the field work at 20% of the SSI/ESI sites. The Quality Assurance Manager, Deputy Director and Executive Director will serve as TNRCC final approval authorities for this PA/SI QAPP. C. Todd Counter will serve as the Health and Safety Officer, independent of the Program Manager. As such, he, or his designee will be responsible for ensuring that all on-site activities comply with the approved site specific Health and Safety Plan.

A generic Health and Safety Plan (H&SP) will be followed during performance of each PA site visit. Individual site H&SPs will be prepared for all SSI sites as part of the work plan development. All H&SPs will be based on TNRCC's health and safety program and TNRCC's understanding of current health and safety regulations.

There will be no more than twelve (12) PAs and eighteen (18) SSIs conducted during this project with the possibility that both a PA and SSI may be conducted at any one location. A minimum of two (2) persons per PA and four (4) persons per SSI/ESI will be used to conduct field activities. At these sites, one TNRCC staff person will be designated as the lead Site Investigation Manager and will have the on-site responsibility for ensuring that the HS&P and QAPP are followed, and that appropriate data are collected to allow for preparation of site-specific SSI/ESI WP. The Site Investigation Manager also will be responsible for planning and conducting the site visit and preparing the final PA, SSI report and/or Documentation Record (for ESI sites, only) for the site.

It is anticipated the TNRCC Program Manager will issue site assignments such that the majority of PAs are completed within the first six (6) months of the project. This will allow those sites which progress directly to an SSI Work Plan to be completed within the final six months of the project. The total anticipated time to complete each PA is 120 hours and each SSI is 400 hours. A detailed schedule for the completion of PAs and SSIs are presented in Tables 1.2 and 1.3, respectively. In the event an expanded SSI (ESI) is warranted, the total anticipated time to complete the ESI is 620 hours from site assignment. If the site is to be proposed for the NPL, an HRS package may be warranted, and the total anticipated time to complete the HRS is 400 hours from completion of the ESI. These schedules may be adjusted to meet specific requirements of the EPA guidance.

The TNRCC Site Investigation Manager designated to lead investigations at the SSI/ESI site will develop a WP and sampling strategy for the site. The information gained from the PA, tentative disposition, and other timely information will be used in determining tentative numbers, nature,

Table 1.2. Schedule of Preliminary Assessments

Activity	Hours After Site Assignment
Site Assignment	0
Draft Preliminary Assessment Scoresheets and Background Research	60
Conduct PA Site Visit	12
Draft PA Report Complete	38
Final PA Report Submitted to EPA	10

Table 1.3. Schedule of Site Inspections

Activity	Hours After Site Assignment
Site Assignment to TNRCC	0
SSI Background Research Completed	68
Work Plan Completed and Approved	60
Health and Safety Plan Completed and Approved	18
Work Plan Executed (includes travel)	123
Laboratory Analyses Complete	40
Draft SSI Report/Prescore Complete	83
Final SSI Report/Prescore Submitted to EPA	16

and location of samples collected. The WP consists (1) a list of project contacts; (2) data quality objectives, and a site background review including site history, descriptions of the site including geology, hydrology, soil conditions, site map(s), and waste handling practices including types and quantities of wastes generated (if known); (3) a WP summary including field personnel, site reconnaissance plan, sampling strategy, sampling locations and map(s), and QA/QC sample protocols and decontamination procedures. The WP will also identify potential targets for the groundwater, surface water, soil exposure, and air pathways; (4) a health and safety plan to describe potential hazards and necessary site specific precautions and preparations for completing the field work described in the sampling plan; and (5) general project requirements such as a schedule, equipment needed, and mobilization/demobilization procedures.

The TNRCC will prepare the WP according to the format agreed to by the EPA for use on the FY'96 and 97' Multi-Site PA/SI Scope of Work. Revisions to this format will be determined by the EPA and TNRCC project managers prior to preparing the first documents. The EPA will be responsible for approving each work plan; however, the decision to proceed with WP implementation may be delegated by the EPA Site Assessment Manager (SAM) to the TNRCC Program Manager, as appropriate.

Subcontractors will be used to assist in report photographic production services. Other needs for subcontractor services will be determined throughout the course of this project. EPA shall choose a laboratory to be used for this project under its Contract Laboratories Program (CLP) and shall incur all costs for sample analyses. The EPA Houston's Laboratory shall provide analytical support for drinking water samples. The sample analyses shall include analysis for all constituents listed on the CLP Routine Analytical Services (RAS) Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL).

Control of subcontractor work quality, schedules, and budgets will be assured by the following means:

- To assure accountability on a personal level and to avoid the problems associated with diffused responsibilities, the subcontractor will designate a single individual who will function as the subcontractor's project manager.
- The subcontractor's project manager will report directly to the TNRCC Site Investigation Managers.
- The subcontractor will establish and maintain a system of controls to ensure that the objectives indicated in the project QA/QC plan will be accomplished. TNRCC personnel will periodically inspect this system of controls to ensure compliance by the subcontractor.

- The subcontractor will specify that the TNRCC Site Investigation Manager has the authority to remove any subcontractor personnel from the project if he or she is not performing satisfactorily.

(A5) PROJECT DEFINITION/BACKGROUND

The major objective of this project is to perform and complete Preliminary Assessments and Screening Site Inspections at sites judged to be potentially hazardous because of current and past operational and waste disposal activities. The PA and SSI reports will provide technical information and data that can be used to determine the score of each respective site according to the Hazard Ranking System.

Preliminary Assessments (PA) and Screening Site Inspections (SSI) will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS), Final Rule, dated December 14, 1990. The EPA furnished guidance for performance of these tasks and it will be used as reference material in collecting data, planning, and conducting on-site activities, and in preparation of the reports for each site. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under CERCLA" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; and 6) Management of Investigation-Derived Wastes During Site Inspections", May, 1991.

In most cases, it will be necessary to obtain advance permission to inspect the sites. The TNRCC will obtain access agreements for each site. The designated TNRCC Site Investigation Manager for each site will prepare a written notification to the site owner/operator of the impending site visit, followed by telephone confirmation by the TNRCC Site Investigation Manager. The TNRCC Site Investigation Manager will also be responsible for notifying the local the TNRCC Regional Office of the impending site visit. The TNRCC Program Manager will provide each member of the TNRCC project staff with written credentials describing the nature of the project and the authority under which it is conducted.

Upon arrival at a site, the inspection team will conduct an initial survey of the site to ensure adequate safety precautions are in place during site activities. The Site Investigation Manager

will, when possible, conduct a detailed interview with site representatives. Interviews with other individuals familiar with the site will be conducted as appropriate before, during, or after on-site reconnaissance activities.

A thorough site reconnaissance, if possible, will be conducted at each site. The inspection team will visually survey and document the location of the site relative to any roads or other access, drainage systems, surface waters, nearby structures, drums, tanks, monitoring wells, facility boundaries, unique geological features, and other factors which may affect pollutant migration pathways. These factors will be recorded, to the extent practical, on a field site sketch which will be prepared during the site visit. The facility sketch also will document the location of sensitive environmental receptors such as on-site and off-site homes and public building, natural areas, and drinking water supplies. Residences within 400 yards of the site will be included in the site sketch. Indicators of existing problems, such as areas of diseased, dying, or distressed vegetation or discolored soil, also will be noted on the site sketch. Photographs will be taken as necessary to document observations and on-site activities. Generalized population information, including collection of environmental equality data, will be based on the number and types of surrounding homes and businesses.

Where operator records are present, these will be reviewed for an indication of the type and quantity of materials disposed of at a given site. Where possible, the party responsible for waste disposal will be determined.

For SSI/ESI visits, environmental samples will be collected in accordance with the approved WP to provide site-specific data on the hazardous substances present as well as pollutant dispersal pathways. The samples collected during the SSIs and ESIs typically will be from the following sources:

- o On-site and off-site soils;
- o Groundwater from existing potable or agricultural water or monitoring wells;
- o Water or waste from open drums, surface impoundments, or evaporation pits;
- o Point of entry into receiving waters in the runoff pathway(s) from the site;
- o Environmentally sensitive areas near the site.

For each PA, initial activities will involve the collection of site background information and completion of a site visit. A Regional EPA site assessment representative will accompany TNRCC personal on the PA site visit and based solely on the field findings an immediate decision

will be made on whether to proceed with preparation of an SSI Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage.

If a site is designated to proceed to the SSI phase, then an SSI Work Plan and final SSI Report will be prepared for submission to the EPA. A complete PA will not be prepared for these sites. An abbreviated PA Report will be prepared for those PA candidate sites which are determined ineligible for CERCLA response by the EPA site assessment representative.

For each SSI, field activities will be conducted in two steps. TNRCC will collect information needed to prepare a work plan before the site visit. Following approval of the work plan, TNRCC will visit the site to execute the work plan, including sampling activities. The collected information, including sample results, will be compiled into a final SSI Report for the site.

Initial preparations for each PA, SSI and ESI site visit will involve obtaining information for preparation of the Health and Safety Plan and SSI/ESI WP. This task also includes obtaining access to the sites and the site inspection visit. Prior to any on-site inspections, the project staff and the TNRCC Program Manager will review the results of the preliminary assessment and/or available EPA and/or TNRCC files to address any health and safety risk concerns, and to assess the level of effort necessary to perform the site visit.

The TNRCC project staff will conduct a detailed background study for each PA/SSI/ESI site prior to any field activities. The purpose of this study is to collect available file information concerning activities at the site, hydrogeologic, photographic and topographic in formation pertinent to the site (to be used in pathway evaluation), and population and ecological information available for the area surrounding the site (to be used in a target evaluation).

Site activities information to be collected during this background study will be primarily the EPA, TNRCC, and other State and Federal agency records on the site. Hydrogeologic and topographic information will be collected at this time primarily from USGS topographic maps, city and county maps, county and regional water reports, county and regional geologic cross sections, state well construction records, soil maps, etc. Population and ecological information will be collected primarily from census figures, USGS topographic maps, public school records, the Texas Manufacturers Index, U.S. Fish and Wildlife and Texas Parks and Wildlife endangered species publications, and additional information if available. Aerial photography, as available from the

Texas Natural Resources Information System, Texas Department of Transportation, and other sources, will also be examined for additional information about the site.

The data collected will, whenever possible, be selected to meet the requirements of the HRS model. It is understood that, at the level of effort appropriate for a PA, it may not be possible at some sites to collect "HRS quality" data to fulfill every requirement of the model. The TNRCC will make every reasonable effort to collect "HRS quality" data for every site, within the limits of the project schedule, budget, and the available information. Every effort will be made to collect the best available information during the performance of each PA. In addition, all SSI/ESI information will be collected in accordance with applicable SI guidance.

The level of effort required for the SSI background research may be greater than that normally required. This increased effort is necessary because the PAs for some of the sites may not have been prepared prior to publication of the current HRS guidance and do not contain complete HRS information. Therefore, this additional PA information may need to be collected during the background study task of the SSI/ESI.

(A7) DQO for MEASUREMENT DATA

A quality assurance (QA) program is essential to assure the quality, controllability, accountability, and traceability of the work being performed for the TNRCC PA/SI Program. Quality assurance encompasses all actions taken by TNRCC and its subcontractors to achieve results which are accurate, reliable, and legally defensible for all aspects of the project. TNRCC and its subcontractors will adhere to the quality assurance procedures outlined herein and will rigorously implement the QA program throughout the duration of the project.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to score and to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with preset standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly if necessary without causing undue expense or delay to the project. The standards and review procedures which TNRCC will use to attain optimum accuracy and completeness of data are outlined in this plan. All subcontractors to TNRCC will be required to follow these standards and procedures, at a minimum.

Table 1.4. Matrix Spike/Matrix Spike Duplicate Control Limits for CLP GC/MS Organic Analyses

	Water		Soil	
Matrix Spike Compound	% Recovery	RPD %	% Recovery	RPD %
Volatile organics:	61-145	14	59-172	22
1,1-Dichloroethene	71-120	14	62-137	24
Trichloroethene	76-127	11	66-142	21
Benzene	76-125	13	59-139	21
Toluene	75-130	13	60-133	21
Chlorobenzene				
Semivolatile organics				
Phenol	12-110	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
1,4-Dichlorobenzene	36-97	28	28-104	27
N-Nitroso-di-n-propylamine	41-116	38	41-126	38
1,2,4-Trichlorobenzene	39-98	28	38-107	23
4-Chloro-3-methylphenol	23-97	42	26-103	33
Acenaphthene	46-118	31	31-137	19
4-Nitrophenol	10-80	50	11-114	50
2,4-Dinitrotoluene	24-96	38	28-89	47
Pentachlorophenol	9-103	50	17-109	47
Pyrene	26-127	31	35-142	36
Pesticides:				
gamma-BHC	56-123	15	46-127	50
Heptachlor	40-131	20	35-130	31
Aldrin	40-120	22	34-132	43
Dieldrin	52-126	18	31-134	38
Endrin	56-121	21	42-139	45
4,4'-DDT	38-127	27	23-134	50

Table 1.5 Surrogate Spike Control Limits
for CLP GC/MS Organic Analyses

Surrogate Compound	Soil/Sediment % Recovery	Water % Recovery
Volatile organics:		
1,2-Dichloroethane-d4	70-121	76-114
4-Bromofluorobenzene	59-113	86-115
Toluene-d8	84-138	88-110
Semivolatile organics:		
Nitrobenzene-d5	23-120	35-114
Terphenyl-d14	18-137	33-141
2-Fluorobiphenyl	30-115	43-116
2-Fluorophenol	25-121	21-110
2,4,6-Tribromophenol	19-122	10-123
Phenol-d5	24-113	10-110
2-Chlorophenol-d4	20-130*	33-110*
1,2-Dichlorobenzene-d4	20-130*	16-110*

* These limits are for advisory purposes only.

The quality assurance objectives for all measurement data include considerations of precision, accuracy, completeness, representativeness, and comparability. Compliance with the QA objectives will be judged individually for each site. QC objectives stated in the EPA CLP Statement Of Work (SOW) are presented in Tables 1.4 and 1.5.

PRECISION

The precision of a measurement is an expression of mutual agreement of multiple measurement values of the same property conducted under prescribed similar conditions. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same exact sample under the same conditions or a matrix spike and matrix spike duplicate. It is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internally (laboratory duplicates) and externally (field duplicates) to the laboratory. Laboratory duplicate control limits for organics are method and laboratory specific, and will be evaluated as part of the EPA-CLP data validation. For metals analysis, a control limit of 20 percent RPD will be used for matrix spike and matrix spike duplicate sample values greater than or equal to 5 times the contract required detection limit. For field duplicates, a RPD of 50 percent will be used as the objective of precision.

Field measurements will be taken of pH, conductivity, temperature, water level, and organic vapor concentration based on HNU[2] or OVA[3] readings. The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. For the pH meter, precision will be tested by multiple readings in the medium concerned. Consecutive field measurement readings should agree within 10% RPD, and within 0.1 pH standard units after the instrument has been field calibrated with standard (NIST-traceable) buffers.

The water level indicator readings will be precise within 0.01 foot for duplicate measurements. The HNU or OVA will be calibrated each day prior to field use. If calibration readings deviate 15 percent or more from the concentration of the calibration gas, the instrument will be recalibrated.

ACCURACY

The degree of accuracy of a measurement is based on a comparison of the measured value with the actual true value. Accuracy of an analytical procedure is best determined based on the recoveries of matrix spike, matrix spike duplicate, and surrogate compounds.

The degree of accuracy and the recovery of analyte to be expected for the analyses of QC samples and spiked samples is dependent on the matrix, method of analysis, and the compound or element being determined. The concentration of the analyte relative to the method detection limit is also a major factor in determining the accuracy of the measurement. For metals analysis, spike recovery limits of 75-125 percent will be used. The QC acceptance ranges and limits for GC/MS organic analyses used to assess the accuracy of the data according to CLP protocol are presented in Tables 2.1 and 2.2. These QC acceptance ranges and limits may vary between laboratories and will be evaluated as part of the EPA-CLP data validation.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment. The pH meter is calibrated with buffer solutions traceable to National Institute of Standards and Technology (NIST) standards. The HNU or OVA will be calibrated daily with calibration gas.

REPRESENTATIVENESS

Samples taken must be representative of the population. All samples will be collected with dedicated equipment. All sampling equipment will be decontaminated prior to initiating sampling activities. Two types of blanks will be taken. The first type, a field blank, is a 40 milliliter VOA[4] vial filled with CLP-specified grade water at a specified sample location during the investigation. After collection, the vial will remain capped and accompany all samples for volatile organic analysis. One field blank (2 VOA vials) will be shipped with each container of appropriate samples. The second type is a rinsate blank and will consist of CLP-specified grade water that has been poured over the equipment after completion of decontamination. The types of blanks collected will be specified by the work plans for each site. The purpose of these blanks is to establish that proper sample bottle preparation, decontamination, and handling techniques have been employed. The blanks will not be counted for the laboratory's quality control protocol for matrix spikes or duplicate samples.

COMPARABILITY

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with previous and future studies. Concentrations will be reported in a manner consistent with general practices. Standard EPA analytical methods and quality control will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with EPA or manufacturer's specifications and will be checked with the frequency specified in the methods.

COMPLETENESS

The completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The EPA-CLP data validation will determine the amount of valid data obtained from each site inspection. At the end of each SSI, completeness of data will be assessed and, if any data omissions are apparent, an attempt will be made to re-sample the parameters in question. The specific objective for the completeness of this project will be greater than or equal to 90 percent for field and laboratory data for each site.

ANALYTICAL PARAMETERS AND QUANTITATION LIMITS

The analytical parameters and their quantitation limits for use on this project will be determined on a per-site basis. All samples will be analyzed by CLP methods. The quantitation limits may vary since they are matrix and analyte dependent.

HOLDING TIMES

Holding times specified by EPA protocols will be set for samples collected under this program. Tables 1.6 and 1.7 list the types of analyses and their holding times.

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[2]HNU = systems photo ionization detector
[3]0VA = organic vapor analyzer
[4]VOA = volatile organics analysis

Table 1.6 Holding Times* and Preservation for Aqueous Samples

Analysis	Extraction Times	Analysis Time	Preservation Method***
Volatile organics (VOA)	NA	7 days 14 days	cool, 4°C HCl to pH < 2 cool to 4°C
Semivolatile organics (BNA)	7 days	40 days after extraction	cool, 4°C
Pesticides/PCBs	7 days	40 days after extraction	cool, 4°C
Metals**	NA	6 months	HNO_3 to pH<2 cool, 4°C
Cyanide	NA	14 days	NaOH to pH>12 cool, 4°C

* Holding times begin at the time of collection.
** Except mercury, analysis time is 28 days.
***Preservation temperature may fluctuate by 2°C.

Table 1.7 Holding Times* and Preservation for Soil and Sediment Samples

Analysis	Extraction Times	Analysis Time	Preservation Method***
Volatile organics (VOA)	NA	14 days	cool, 4°C
Semivolatile organics (BNA)	14 days	40 days after extraction	cool, 4°C
Pesticides/PCBs	14 days	40 days after extraction	cool, 4°C
Metals**	NA	6 months	cool, 4°C
Cyanide	NA	14 days	cool, 4°C

* Holding times begin at the time of collection.
** Except mercury, analysis time is 28 days.
***Preservation temperature may fluctuate by 2°C.

(A9) TRAINING

A large percentage of TNRCC Site Investigation Managers have prior experience in conducting site investigations; however, all inspectors will undergo a formal training program. Major areas covered during the formal training project will be the objectives of the PA and SSI, preparation for inspection, legal ramifications, health and safety considerations, use of monitoring and sampling equipment in the field, sample shipment and chain-of-custody procedures, the appropriate procedures to be followed relative to any denial-of-entry problems encountered, and other aspects of the work to be performed under this project.

Each TNRCC employee involved in sample collection will be trained on how to collect representative samples from every medium which might be encountered. Project personnel will receive additional training in proper field documentation and in health and safety procedures. All training will be documented, and records will be maintained by the Program Manager.

(A10) DOCUMENTATION and RECORDS

Documentation Records will include documentation for all HRS factors evaluated. All assertions of fact will be referenced in the record. All reports will be submitted to the EPA as they are completed. Any corrections or additions to the submitted material that the EPA deems necessary and appropriate will be made by the TNRCC within budget constraints. A PA, SSI/ESI WP, SSI Report, and Documentation Record will be deemed complete and final when the EPA approval is received, or within six (6) months of submittal, whichever comes first.

Following the site visits and completion of analytical work, the TNRCC will prepare a PA (Abbreviated) and/or SSI report or Documentation Record (for ESI sites only) highlighting significant findings for each site. The abbreviated PA Reports will be prepared in accordance with the requirements stated in the "Guidance for Performing Preliminary Assessments Under CERCLA", September 1991, Section 4.4 Abbreviated Reporting. The final SSI reports will be prepared in accordance with the report outlines approved by the EPA. Documentation Records will be prepared in accordance with current guidance and by using the companion WordPerfect® version of the Documentation Record. Should additional guidance become available prior to completion of this project, the TNRCC will evaluate the effect that conformance to this guidance will have on the schedule and budget, and will submit a revised schedule and budget to the EPA for approval.

The SSI reports will contain a description of the site, the operating history and nature of waste handling at the site, and a discussion of waste sources, pathway characteristics, and identification and description of potential human and environmental targets. In addition, the SSI report will

contain a description of the data collected, analytical results, and QA/QC data. Supporting documents will be included in the SSI report as appendices and will consist of stratigraphic, hydrogeologic, and topographic information; a site sketch other pertinent maps; laboratory and chain-of-custody report originals; photographs; field notes; and reports from previous investigations at the site. All data collected during each SSI/ESI visit will be validated using the most current EPA data validation guidelines and any EPA Regional instructions.

QUALITY ASSURANCE REPORT

A summary of all QA activities and findings during the course of this project will be reported to the EPA on a site specific basis with the final site inspection reports. Other project-related quality assurance items and corrective actions will be discussed in the monthly progress reports. These may include the following items:

1. Summary of QA management, including any changes;

2. Measures of data quality from the project;

3. Significant problems related to work quality, and the status of any corrective actions implemented;

4. Results of QA performance audits;

5. Results of QA systems audits;

6. Assessment of data quality in terms of precision, accuracy, completeness, representativeness, and comparability; and

7. Quality-assurance-related training.

RECORD KEEPING

All information pertinent to PA site visits and SSI sampling activities will be recorded in a logbook. This book will be bound and have consecutively numbered pages. Entries in the logbook will be made in ink and will include, at a minimum, a description of all activities, the names of all individuals involved (sampling and oversight), date and time of sampling, weather conditions, any problems, and all field measurements.

SECTION 2

MEASUREMENT/DATA ACQUISITION

(B1) SAMPLING PROCESS DESIGN

After approval of the SSI work plan, the field activities will be executed. At each site, these activities may include shallow soil sampling, sediment sampling, surface water sampling, and groundwater sampling.

Detailed reports on all PA and SSI non-sampling data collection and SSI sampling activities will be kept in field logbooks. In this book will be noted the date, time, location, and identification of each sample, along with the collector's name, a description of all equipment used and any problems encountered, and general comments of the inspection team. Logbooks also are used to record pertinent information regarding the site itself, including date, time, location, and identification of all photographs taken during the site visit.

Proper identification and labeling of samples is crucial to an effective sampling program. Immediately upon collection, each sample must be sealed and tagged. The tag should be marked with a sample identification number, station location, type (composite or grab), concentration (low, medium, or high), the parameters requested, collector's name, and the date and time of sample collection.

For many of the SSIs, the determining factor of hazard evaluation will be the data provided by sampling and analytical activities. Thus, it is important that QA/QC be maintained for each sample. The purpose of this Section is to outline specific procedures for inspectors to use while acquiring and handling samples during an inspection to ensure that quality data are obtained.

EPA-certified clean sample bottles will be used for sample collection. Custody of these bottles will be maintained by documenting the batch number of the sealed box, documenting opening of the box, and keeping the bottles locked up at all times. If returned to the office, the bottles will be placed in a sealable container and secured with custody seals.

(B2) SAMPLE METHODS REQUIREMENTS

This Section discusses the standard sampling procedures. Other sampling procedures may be used as determined necessary by the lead Site Investigation Manager and with approval of the Technical Director or Program Manager.

Regardless of sample type, the following principles and procedures should be adhered to during the sample collection phase of a site inspection:

1. Obtain ice before visiting a site where sample collection is involved.

2. Add appropriate preservatives to the sample bottles at the time of sample collection. The bottles required for each analysis are shown in Tables 2.1 and 2.2.

3. If there is reason to suspect the presence of toxic vapors, precede sampling activities by an initial survey of suspect areas, using appropriate safety gear and a photo ionization detector (or equivalent). The potential use of air monitoring equipment should have been specified in the SSI Work Plan. If it was not, and if organic vapor presence is possible, contact the Program Manager and Project Safety Officer for possible changes in safety procedures.

4. If possible, collect background samples first, then proceed from the probable least contaminated to most contaminated sampling points.

5. Change disposable gloves between sampling points, placing used gloves in a plastic bag for disposal.

6. If it is necessary to reuse sampling devices, use the specified decontamination procedures between sampling points.

7. At each sampling location,
   a. Photograph the collection of samples.
   b. Record in the logbook:
   - Sample number;
   - Photo number;
   - Location (show on site sketch);
   - Type of sample;
   - Time; and
   - Relevant observations.

Table 2.1 Bottles Required for Aqueous Samples

Analysis	Required Volume	Container Type
Volatile Organics	80 mL	2 40-mL glass vials
Extractable Organics (BNA and pesticide/PCB)	1 gallon	2 80-ounce or 4 1-liter amber glass bottles
Metals	1 liter	1 1-liter polyethylene bottle
Cyanide	1 liter	1 1-liter polyethylene bottle

Table 2.2 Bottles Required for Soil and Sediment Samples

Analysis	Required Volume	Container Type
Volatile Organics	240 mL	2 120-mL widemouthed glass vials or 2 4-ounce widemouth glass jars
Extractable Organics (BNA and pesticide/PCB)	6 ounces	1 8-ounce or 2 4-ounce widemouthed glass jars
Metals and Cyanide	6 ounces	1 8-ounce or 2 4-ounce widemouthed glass jars

8. If a facility representative requests, they will be allowed the opportunity to collect split samples. If these are desired, place samples directly in different containers at the sampling point rather than splitting them at a later time. In the event there may not be enough soil, sediment, and/or groundwater volume to provide split samples, collect the SSI required sample first and than provide the remaining volume to the facility representative.

9. If samples can be collected in a short period of time (less than 20 minutes), leave the cooler with ice at the car for convenience. Before placing samples in the iced cooler:

   a. Complete the sample tags and labels, and place clear tape over the sample labels on the sample containers to protect the writing from moisture.

   b. Double check the pH of all preserved water samples (exclusive of VOA samples).

   c. Place a custody seal around the bottle cap.

   d. Wrap the sample containers with plastic foam, bubble pack, or equivalent to protect against breakage.

   e. The TNRCC will include in each ice chest with samples to be shipped for analysis, a temperature blank taped to the side of the chest prior to shipping.

   f. Place the sample containers in plastic Ziploc® bags or equivalent to prevent melted ice from contacting the container.

   g. Place wrapped sample containers into ice chests filled with 2 to 3 inches of vermiculite.

10. Remove water from melted ice frequently, and replace with fresh ice. Place ice in plastic Ziploc® or sealable bags to minimize water leakage during shipment.

The following standard operating guidelines are presented for specific sample types.

GROUNDWATER WELL SAMPLING PROCEDURES

General

The primary consideration is to obtain a representative sample of the groundwater zone of interest without mixing the sample with stagnant (standing) water in the well casing.

To safeguard against collecting nonrepresentative stagnant water in a sample, the following guidelines and techniques will be adhered to during sample withdrawal:

1. As a general rule, all monitoring wells shall be pumped or bailed a minimum of three volumes of water in the well casing with three (3) consecutive consistent readings within 10% RPD for conductivity, ± 1°C for temperature, and within ± 0.5 pH units before representative samples are withdrawn.

2. For wells that can be pumped or bailed to dryness with the sampling equipment, the well should be evacuated and allowed to recover to 85 percent of original water level before sample withdrawal. In the event the well has not recovered to 85 percent after 24 hours, a sample may be drawn from the well. Enter the well volume recovered into the field logbook.

3. The purge waters will be managed according to guidance provided in the "Management of Investigation-Derived Wastes During Site Inspections", May 1991. The preference is to leave both RCRA hazardous and non-hazardous investigation-derived wastes on-site whenever it complies with regulations and does not pose any immediate threat to human health and the environment.

Sampling, Monitoring, and Evacuation Equipment

Sample containers will conform to EPA regulations for the appropriate constituents.

The following equipment should be on hand when sampling wells:

1. Coolers for sample shipping and cooling, chemical preservatives, and appropriate packing cartons and filler.

2. Thermometer, pH paper and meter, camera and film, labels, appropriate keys (for locked wells), tape measure, water level indicators, and specific-conductivity meter.

3. Pumps. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps.

4. Bailers and monofilament line with tripod-pulley assembly (if necessary).

5. Decontamination solutions--tap water, distilled water, Alconox, isopropanol, CLP specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical to manufacture, easily cleaned, and reused, able to operate at remote sites in the absence of power resources, and capable of delivery variable rates for well flushing and sample collection.

Calculation of Well Volume

Calculations are to be made according to the following steps:

1. Obtain all available information on well construction (casing, screens, etc.).

2. Determine well or casing diameter.

3. Determine static water level (feet below top of casing).

4. Determine depth of well from top of casing.

5. Calculate number of linear feet of static water (total depth minus the static water level).

6. Calculate one well volume in gallons: $V = Tr^2 (0.163)$, where T is linear feet of static water, and r is the inside radius of the well of casing in inches.

7. Determine the well volumes in gallons to be evacuated before sampling.

If possible, a number of observations will be made when groundwater sampling is to take place. Some of the information can be gained from file review prior to a site inspection.

1. Note if monitoring wells are locked. Arrangements must be made to secure keys or to remove locks by other means and re-secure the wells.

2. Note the condition of the monitoring wells (i.e. casing, concrete pad, etc.).

3. Note well diameters to ensure that a pump and/or bailer of the proper size will be available. The diameter is also necessary for calculating the wells' static water volume.

4. Note the type of casing materials--PVC, steel, etc.

5. Note any observable physical characteristics of the groundwater as it is being sampled--color, odor, turbidity, etc.

6. Measure the static water level of each well before sampling, if possible. This is best accomplished with an electronic water level indicator. Similarly, determine the total depth of the well before sampling. Obtain these measurements whether or not well logs are available, since the measurements are required in calculating the static water volume of the well.

7. Measure the pH, temperature, and specific conductivity of the groundwater being sampled. To avoid possible contamination problems, measure temperature, pH, and specific conductivity on a portion of groundwater which is not in a sample container to be sent out for analysis.

SURFACE WATER SAMPLING PROCEDURES

Surface water sampling locations will be selected according to the probability that they will show contaminants migrating from a site. In general, samples will be taken from streams running through or adjacent to a site, including those bodies of water which may receive surface runoff or leachate from a site. Samples will only be collected where it can be shown that the site provides the only source of contaminants to the surface water body. Care will be taken in sampling leachate breakouts, which may have high concentrations of contaminants. Surface water will also be sampled from any adjacent standing bodies of water such as ponds, lakes, or swamps which might be receiving contaminants.

Grab samples will be collected using a pond sampler. The pond sampler, described in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA 1980 (EPA-600/2-80-018), consists of a beaker attached with a clamp to a telescoping aluminum pole. This sampler allows a sample to be collected several feet from the bank or berm.

TAP WATER SAMPLING PROCEDURES

Well depth, casing size, and holding-tank volume will be obtained, if possible to calculate the volume of the system, and the system will be evacuated by removing three to five volumes by letting a tap run. If the well depth, casing size, or holding-tank volume is not readily available or is unknown, a tap will be opened and allowed to run at highest flow for at least 15 minutes. Well purging well be considered complete after three consistent readings of pH and conductivity. These readings can be obtained within the 15 minutes the tap is allowed to run. The well evacuation strategy will be documented in the field book.

Samples will be collected in containers in accordance with the sampling guidelines from a point as close to the well as possible and before the water is processed through any water treatment devices (e.g., softeners or filters). In many cases this may not be possible. When samples must be collected after the filtration or softener system, the situation will be documented in the logbook. The exact type of filtration system or softener in use will be recorded. To determine whether desorption of the filters is occurring, samples may be collected after water has passed through treatment devices. When possible, do not collect samples through a water hose. Samples should be collected directly from the spout.

If samples are taken from direct water main connections, the spigot will be flushed for 2 to 3 minutes (15 to 30 minutes is not necessary) to clear the service line. Water parameters (conductivity, temperature, and pH) will be measured. Well purging will be considered complete after three (3) consistent readings of pH, temperature and conductivity. Samples will *not* be collected from spigots after treatment (except as noted above) or from spigots that leak around their stems **or that** contain aeration devices or screens within the faucet.

For private wells equipped with hand or mechanical pumps, the water will be pumped for 5 minutes before the sample is collected directly from the spout.

SURFACE SOIL SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the soils with the minimum of samples. A surface inspection of the subject area will be made to locate pertinent features (e.g., rock outcrops, drainage patterns, surface runoff, erosion areas, etc.) and to evaluate the relationship among these features and potential sources of pollution. The locations of sediment deposition areas are good indicators of surface runoff direction.

A method of obtaining a shallow soil sample is to use stainless steel spoon or shovel. When deemed appropriate, a deeper soil sample may be obtained through the use of a soil corer. After collection, the soil sample will then be placed in the appropriate glass bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs. If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to minimize headspace. A decontaminated shovel or spade can be used to uncover the top 6 inches of soil so the sample can be collected from beneath the surface.

Sampling equipment such as stainless steel scoops and spoons, and shovels or spades must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used. If dedicated equipment are not used, then an equipment rinsate sample shall be collected at the end of each sampling day to demonstrate decontamination efficiency by TNRCC field personnel.

SEDIMENT SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the sediments with the minimum of samples. The primary consideration in sample site selection will be to choose an area of quiescent settling with low hydrologic activity or energy, and to evaluate these areas and potential sources of pollution. For example, areas that are: 1) inside the bend of channels; 2) backwater areas or side channels; and 3) of heavy shoaling and deposition. Quiescent areas are conducive to the settling of finer materials.

Sediment samples will be collected by use of a stainless steel spoon; or for samples greater than six (6) inches beneath the water surface, samples will be collected using either an Ekman dredge or sediment corer. When using a dredge, it will be lowered to the bottom of the water body with a minimum of substrate disturbance. Once the dredge jaws have been triggered, the closed dredge will be retrieved at a moderate speed of less than two (2) feet/second. Water overlying the sediment in the dredge will be gently

decanted by slightly tipping the dredge until the water runs out the top. The decanting process will be completed in a manner to avoid the removal of surficial sediments. In order to avoid contamination from material on the dredge walls, a stainless steel spoon will be used to remove sediments to a depth of one inch and no closer than 0.75 inches to the wall of the dredge. The sediment sample will then be placed in the appropriate glass bottle. Pebbles and sticks will not be transferred to the sample bottle. Additional dredge samples will be collected as needed to fill the sample bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs.

If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to minimize headspace. The Ekman dredge and stainless steel spoons must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used.

DECONTAMINATION PROCEDURES

To prevent contamination of samples by materials originating from the variety of on-site sampling tools and equipment, all sampling equipment (sample scoops, bailers, surface water dippers) will be decontaminated. Dedicated sampling equipment will be available for each sample planned. All equipment to be used at one site will be decontaminated in one batch prior to initiating any sampling. Each sampling tool will be placed in an individual sealable plastic bag or wrapped in a large plastic trash bag and closed with a custody seal. In the event that additional sampling is required or a sampling tool's integrity is questionable, then that tool will go through a decontamination process. The decontamination procedures are as follows:

1. Rinse equipment with tap (potable) water.

2. Clean the equipment with a brush in a solution of laboratory-grade detergent (Liquinox, Alconox, or equivalent) and potable water.

3. Rinse with tap water.

4. Rinse with 10 percent nitric acid solution, (trace metals grade) if analyzing for metals.

5. Rinse with distilled or deionized water.

6. If analyzing for organics, rinse with reagent-grade isopropanol.

7. Rinse with deionized water.

8. Air dry.

9. Place in plastic sealable bag if immediate use is not expected.

The sampling equipment will be cleaned as described above before its use for collecting each sample. After sampling is complete, each sample tool will be cleaned with a detergent wash and rinsed with distilled water to remove any potential contamination.

(B3) SAMPLE HANDLING/CUSTODY REQUIREMENTS

Sample custody is an integral part of any sample collection and analysis plan. Several steps for maintaining sample custody apply to field sample custody versus laboratory sample custody. First, in the field, the appropriate collection, identification, preservation, and shipment of the samples will ensure sample integrity. The second step is correct sample bottle identification and preparation. Lastly, when samples reach the laboratory, they are assigned a laboratory number and maintained at 4°C until sample preparation and analyses can be performed.

FIELD SAMPLE CUSTODY

Sample custody and documentation procedures described in this Section will be followed throughout all sample collection for all TNRCC SSIs. Components of sample custody are field logbooks, sample labels, sample tags, and chain-of-custody forms. CLP Organic and Inorganic Traffic Report (TR) forms will serve as chain-of-custody forms for this project. When Dioxin samples are to be collected the PCDD/PCDF Traffic Report (For Dioxin CLP Analysis) form will be used for this project.

FIELD LOGBOOKS

Bound field logbooks will be maintained by the Site Investigation Manager and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. Each page in the logbook will be initialed by the author and signed after the last entry of each day. All entries by persons other than the author will be initialed or signed. All entries will be signed and dated.

All information pertinent to the field survey and sampling will be recorded in the logbooks. The logbooks will be bound books with consecutively numbered pages that are at least 4 1/2 inches by 7 inches in size. Waterproof ink will be used in making all entries. Entries in the logbook will include, at the minimum, the following:

· General information:

- Names and titles of author and assistant, date and time of entry, and physical/environmental conditions during field activity
- Location of sampling activity
- Name and title of field crew.

· Sampling documentation:

- Sample medium (e.g., soil)
- Description of sampling point(s)
- Date and time of collection
- Sample identification number(s).
- Photographs

· Other information:

- Names and titles of any site visitors or interviewees
- Field observations and unusual field conditions
- Any field measurements made (such as pH, conductivity, temperature) including specific calibration data and documentation of field equipment (serial number, decontamination, etc.)
- Modifications to the work plan
- Sample handling (e.g., preservation with ice).

None of the field logbooks or chain-of-custody documents will be destroyed or discarded, even if they are illegible or contain inaccuracies that require a replacement document. If a previously recorded value is discovered to be incorrect, the wrong information will be crossed out in such manner that it is still legible, the correct value written in, and the change initialed and dated. If the change is made by someone other than the original author or if the change is made on a subsequent day, a reason for the change will be recorded at the then-current active location in the logbook, with cross-references.

SAMPLE TAGS

All samples collected at the site will be placed in an appropriate sample container for preservation and shipment to the designated laboratory. Each sample will be identified with a separate identification label and tag. The bottles and ice chests will be sealed with custody seals. Sample identification tags and custody seals will be provided by the CLP Sample Management Office. The tag will indicate if the sample is a split sample. The label will contain the sample number. The following information will be recorded on the tag:

- Analyses to be performed
- Sample identification number
- Source/location of sample
- Type of sample (composite or grab)
- Preservatives used (ice)
- Date
- Time (a four-digit number indicating the 24-hr clock time collection; for example, 1430 for 2:30PM)
- Sampler's signature
- CLP case number.

Once the tag is complete, a custody seal will be placed over the lid of the bottle. The custody seal will show the date and sampler's signature.

TRAFFIC REPORT FORMS

Introduction - Samples and Sample Numbers

The CLP organic and inorganic multi-sample Traffic Reports/Chain-of-Custody forms (TRs) document samples shipped to CLP laboratories. They also enable the Sample Management Office (SMO) and the Region to track samples and ensure that the samples are shipped to the appropriate contract laboratory. TRs will be used each time Routine Analytical Services (RAS) samples are shipped to a CLP laboratory. The TRs may document up to ten samples shipped to one CLP laboratory under one case number and RAS analytical program.

The TR includes a chain-of-custody record which is located at the bottom of the form. The form is used as physical evidence of sample custody. According to EPA enforcement requirements, official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. The lead Site Investigation Manager is responsible for the care and custody of the sample until sample shipment.

A sample is considered to be in custody if any of the following criteria are met:

1. The sample is in possession of the sampling team or is in view after being in possession.

2. The sample was in possession and then locked up or sealed to prevent tampering.

3. The sample is in a secured area, and security is documented.

CLP sample types are defined by the RAS analytical program. Under the RAS Protocol (SOW), a RAS sample consists of a low or medium concentration water matrix or a soil/sediment matrix that is single phase and homogeneous. No oily sample, nor a multi-phasic sample can be shipped to a CLP laboratory operating under the RAS contract. Such high concentration samples are handled only by Special Analytical Services (SAS) CLP laboratories. The collection and management of high concentration samples will be conducted in accordance with the requirements outlined in the "Region 6 CLP Training Manual", August 1996.

Low concentration samples are samples collected from off-site areas, where hazards are thought to be significantly reduced by normal environmental processes. Medium concentration samples are those where a compound or element may comprise as much as 15% of the total sample.

Low/medium concentration inorganic, low to medium concentration organic, and high concentration organic. Low/medium inorganic samples may be analyzed for total metals, cyanide, or both. Low/medium organic samples may be analyzed for VOAs, base/neutral/acid (BNAs), pesticide/PCBs, or any combination of these. High concentration organic samples may be analyzed for VOAs, BNA/pesticide/PCBs, and aroclors/toxaphenes. Inorganic samples are documented on Inorganic TRs. Organic and high concentration samples are documented on Organic TRs.

A CLP sample is one matrix - water or soil - never both. The CLP sample is further defined as consisting of all the sample aliquots from one station location, for each matrix and RAS analytical program.

The CLP generates unique sample numbers that must be assigned to each organic and inorganic sample. The unique CLP sample numbers are printed at SMO on adhesive labels and distributed to the region as requested. The field team leader will be responsible for assigning this critical sample number correctly and transcribing it accurately on the TR.

Organic sample numbers are in the format XX123, and have ten labels per strip four for extractables, two for VOAs, and four blank (extra). **UNUSED LABELS will be destroyed to prevent duplication of sample numbers.**

Inorganic sample numbers are in the format MXX123 and have seven labels per strip-- two for total metals, two for cyanide, and three extra (see Attachment 1). Remember that the unique sample number must only be used once. **EXTRA LABELS must be destroyed.**

Use only the labels provided by EPA Region 6. CLP sample numbers are alphabetically coded to correspond with each region as follows:

Letter Code			Letter Code		
Organic	Inorganic	Region	Organic	Inorganic	Region
A	MA	I	F	MF	VI
B	MB	II	G	MG	VII
C	MC	III	H	MH	VIII
D	MD	IV	Y	MY	IX
E	ME	V	J	MJ	X

Remember:

- TRs must be used for each case number with every shipment of samples to each CLP laboratory.
- Organic samples, high concentration samples, and inorganic samples are assigned separate, unique sample numbers. Each sample consists of all the sample aliquots from a sample station location for analysis in one of the three analytical programs.
- A CLP RAS sample will be analyzed as either a water or a soil sample.
- Prevent accidental duplication of sample numbers by destroying unused labels.
- Use the sample numbers specific to EPA Region 6.

- Contact the Program Manager or Technical Director at telephone number 512/239-2514 or 512/239-2512 if you need to collect more than the previously approved number of samples or a high concentration sample.

- Call Regional Sample Control Center (RSCC) at telephone number 713/983-2130 or 713/983-2137 if you have any questions about using TRs.

Forms Completion - Case Documentation

Instructions for filling out the Organic and Inorganic Traffic Report/Chain of Custody forms are as follows:

Top of Form

- SAS Number

  - Enter this number only if explicitly told to do so by the RSCC.

  - Case Number

  - Enter this number.

Box No. 1

- Project code/site information:

  - Leave the Project Code, Account Code, Regional Information and Non-Superfund Program fields blank.

  - Enter the Site name, City/State and Site Spill ID in the designated spaces.

Box No. 2

- Regional information:

  - Enter the EPA Region number (6), the name of your Sampling Company (TNRCC), and your name and signature in the designated spaces.

Box No. 3

· Type of activity:

· Check funding level for sampling. Next, check the code which describes the task of the sampling mission:

Funding Level

SF - Superfund
PRP - Potential responsible party
ST - State
FED - Federal

Pre-Remedial

PA - Preliminary Assessment
SSI - Screening Site Investigation
LSI - Listing Site Investigation

Remedial

RIFS - Remedial investigation feasibility study
RD - Remedial design
O&M - Operations and maintenance
NPLD - National priorities list delete

Removal

CLEM - Classic emergency
REMA - Removal assessment
REM - Removal
Oil - Oil response
UST - Underground storage tank response

Box No. 4

· Shipping Information:

· Enter the Date Shipped, the Carrier (i.e. Federal Express, Purolator, Airborne) and the Airbill Number in the appropriate spaces.

Box No. 5

· Ship to:

· Enter the name of the CLP laboratory contact (sample custodian) and its full address in the box.

Box No. 6

· Preservative:

· This box provides a list of commonly-used preservatives. Please enter the appropriate preservative used in Column D.

Box No. 7

· Sample description:

· This box provides a list of the description/matrices of samples that are collected. Please enter the appropriate description in Column A.

Completing the Form - Sample Documentation

· Carefully transcribe the CLP Sample Number(s) from the printed sample labels on the TR in the space provided.

Note: If you have made a mistake, do NOT attempt to erase or write over your mistake. Draw a single line through the mistake and initial and date it. Then, enter the correct information on the next line.

Complete columns A through G to describe the sample.

Column A, Sample Description

Enter the appropriate sample description code from Box No. 7.

When out in the field:

If sampling groundwater or surface water, describe both VOA TRIP BLANKS and EQUIPMENT RINSATE SAMPLES as No. 1 "Surface Water."

If sampling only soil/sediment, describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

When conducting a laboratory decontamination event:

Describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

Note: Item No. 6 "Oil" and item No. 7 "Waste" are for SAS projects only. DO NOT SHIP OILY SAMPLES OR WASTE SAMPLES WITHOUT MAKING PRIOR ARRANGEMENTS WITH THE PROJECT MANAGER AND RSCC.

Column B, Concentration

Organic--If sample is estimated to be low or medium concentration, enter "L." When shipping SAS high concentration samples (previously arranged with Program Manager and RSCC), enter"H."

Inorganic--Enter "L" for low concentration, "M" for medium concentration, and "H" for high concentration (under previous SAS arrangement).

Note: Ship medium and high concentration organic and inorganic samples in metal cans.

Column C, Sample Type

Please enter which type of sample (composite or grab) was collected.

Column D, Preservation

Please enter preservation used (i.e., HCL, NaOH, HNO_3, H_2SO_4) refer to Box No. 6 or the reference number of the preservation (1-7, N). Always include ice as a preservative in addition to any chemical preservative used.

Column E, RAS Analysis

Check the analytical fractions requested for each sample, for example, VOAs, SVs, and pesticides are for low/medium concentration organics. Request only total metals and cyanide for RAS low/medium concentration inorganics.

Note: Aroclors/Toxaphenes may be requested, when using the High Concentration SOW, in a SAS Request.

Note: Either total or dissolved metals can be requested for each individual inorganic sample assigned a unique sample number, but not both analyses. A unique number must be assigned for each, even though they are from the same station location.

Column F, Regional Specific Tracking Number or Tag Number

Enter the Region specific tracking number or tag number(s) in the space provided. Since space is limited try to use tag numbers in a sequential order.

Column G, Station Location Number

Enter the Station Location Number in the space provided.

Column H, Month/Day/Year/Time of Sample Collection

Record the month, day, year, and time in military time (e.g., 1600 hours = 4:00 P.M.) of sample collection.

Column I, Sampler Initials

Enter the samplers initials.

Column J, Corresponding CLP Organic/Inorganic- Sample No.

Enter the corresponding CLP sample number for organic or inorganic analysis.

Column K, Designated Field QC

Enter the appropriate qualifier for "Blind" Field QC samples in this column.

Note: All samples must have a qualifier.

Blind Field QC	Qualifier
Blank	B
Duplicate	D
Rinsate	R
Performance Evaluation Samples	PE
Not a QC sample	--------

Note: This information will be entered into EPA Headquarters database to track QC sample data. Please complete this Section carefully and accurately.

Box Titled, "Shipment for Case Complete (Y/N)"

This should reflect the status of the samples scheduled at a lab for a specific case. When ALL samples scheduled/collected for shipment to a lab for a specific case have been shipped, the case is complete.

Box Titled, "Page 1 of "

Please enter the number of TRs per shipment.

Box Titled, "Sample Used for Spike and/or Duplicate"

Please enter sample number to be used for matrix spike and/or duplicate sample (internal lab QC). One per twenty/matrix/concentration/lab. See back of TR form.

Box Titled, "Additional Sampler Signatures"

Please record any additional sampler signatures you are unable to record in box 2.

Box Titled, "Chain-of-Custody Seal Number"

Leave the Chain-of-Custody Seal Number blank (Not used in Region 6).

Box Titled, "Split Samples Accepted/Declined"

Sampler should ask sight owner, PRP, etc. whether they want split samples taken. The split samples are either accepted or declined. Sampler should record their signature if split samples are collected and check the appropriate box.

How and When to Separate and Send Traffic Report/Chain-of-Custody Form Copies

When all paperwork has been completed by the sampler and samples are ready to be shipped:

Bottom 2 copies (white and yellow) of the traffic report/chain-of-custody forms should be placed in a plastic bag and taped to the inside of the cooler.

Top Blue/Green copy - Send to Region within five (5) working days from date of sample shipment. On this copy indicate in Column K the duplicate sample number.

Myra Perez
USEPA Region 6
10625 Fallstone Road
Houston, Texas 77099

Pink copy - Send to Sample Management Office (SMO) on the same day as the samples are shipped.

Sample Management Office
300 North Lee Street
Suite 200
Alexandria, Virginia 22314

Instructions on the Reverse

Instructions summarizing CLP sample volumes, packaging, and shipment reporting requirements are printed on the back of the TRs.

SHIPPING OF SAMPLES

Samples will be shipped and delivered to the designated laboratory for analysis daily. During sampling and sample shipment, the lead Site Investigation Manager (or designee) will contact the SMO (designated on the CLP RAS Lab Assignment information facsimile) to inform them of shipments. **TNRCC WILL NOT CONTACT THE RECEIVING LABORATORY!!**

The samples will be shipped in ice chests by an overnight carrier such as Airborne Express. The TR forms (white and yellow) will be placed within the ice chest, which will be sealed with custody seals and/or tamper-resistant tape. Custody seals will be signed by the sample custodian shipping the samples. The air bill number will be noted on the chain-of-custody form. In addition the Airbill and TR form(s), each ice chest will contain an additional Airbill to provide for return of the ice chest to Judie Mattocks MC-142, Pollution Cleanup Division, TNRCC, Technical Park Center, Building D, 12100 Park 35 Circle, Austin, Texas 78753.

(B4) ANALYTICAL PROCEDURES and (B10) DATA MANAGEMENT

All analytical procedures will conform to analytical methods specified in the Routine Analytical Services (RAS) contract with the EPA. All data is managed by EPA in accordance with the USEPA Contract Laboratory Program Statement of Works for Organic and Inorganic Analyses. Data received by TNRCC in accordance with the 1996 and 1997 Cooperative Agreement is returned to EPA after validation for use in the SSI reports. EPA maintains full control of record-keeping procedures, receipt of data from the laboratory, and for detecting/correcting laboratory errors.

As per the EPA-CLP Statement of Work for Organic Analysis (including February 1994 revision), laboratories are required to perform any method specified in Exhibit D for volatile organic compounds (CLP-VOA), semivolatile organic compounds (CLP-SV), and pesticide/PCB compounds (CLP-PEST). As per the EPA-CLP Statement of Work for inorganic analysis (including February 1994 revision), laboratories are required to perform methods specified in Exhibit D. Metals will be analyzed using the 200 series, CLP-modified, methods as specified in Exhibit D. Cyanide will be analyzed by method 335.2 CLP-modified. Table 2.3 list the methods to be performed during this project under the RAS contract.

Table 2.3 Analytical Procedures for USEPA-CLP

Parameters	Method
Organics	
Volatile organics (VOA)	CLP-VOA
Semivolatile organics (BNA)	CLP-SV
Pesticides/PCBs	CLP-PEST
Inorganics	
Cyanides	335.2 CLP-M*
Metals	
Aluminum	202.2 CLP-M or 202.1 CLP-M
Antimony	204.2 CLP-M
Arsenic	206.2 CLP-M
Barium	208.2 CLP-M or 202.1 CLP-M
Beryllium	210.2 CLP-M
Cadmium	213.2 CLP-M
Calcium	218.2 CLP-M
Chromium	215.1 CLP-M
Cobalt	219.2 CLP-M or 219.1 CLP-M
Copper	220.2 CLP-M or 220.1 CLP-M
Iron	236.2 CLP-M or 236.1 CLP-M
Lead	239.2 CLP-M
Magnesium	242.1 CLP-M
Manganese	243.2 CLP-M or 243.1 CLP-M
Mercury	245.1 CLP-M, 245.2 CLP-M, or 245.5 CLP-M
Nickel	249.2 CLP-M or 249.1 CLP-M
Potassium	258.1 CLP-M
Selenium	270.2 CLP-M
Silver	272.2 CLP-M
Sodium	273.1 CLP-M
Thallium	279.2 CLP-M
Vanadium	286.2 CLP-M or 286.1 CLP-M
Zinc	289.2 CLP-M or 289.1 CLP-M

* CLP-M modified for the Contract Laboratory Program

(B5) QUALITY CONTROL REQUIREMENTS

Quality assurance for analytical work on this project will involve analysis of blank samples, spiked samples, and duplicate samples. For each group of 20 samples (or less if fewer than 20 samples are collected) of similar matrix (i.e., groundwater/surface water, soil/sediment) collected at each site, CLP internal laboratory QA/QC analysis will be conducted on one blank, one spiked, and one duplicate spiked sample. Field duplicates will be collected at a rate of 10% for each matrix and/or one per day, whichever is greater. Also, the TNRCC will include in each ice chest with samples to be shipped for analysis a temperature blank taped to the side of the chest prior to shipping.

LABORATORY QUALITY CONTROL BLANKS, SPIKED BLANKS, AND MATRIX SPIKES

Analysis of blank samples verifies that the analytical method does not introduce contaminants. The spiked blank is generated by addition of standard solutions to the blank water. The matrix spike will be generated by the CLP laboratory through the addition of standard solutions to a randomly selected field sample. Extra volume (triple volume) for a matrix spike and matrix spike duplicate will be collected for one water sample (groundwater or surface water, but not both) by the field team and sent to the assigned CLP Laboratory for internal quality control. In addition, one soil sample (no extra volume) will be designated on the TR by the field team and sent to the designated CLP laboratory for internal quality control.

FIELD BLANKS

Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA field blank will be analyzed to monitor for possible sample contamination. The field blank also serves to detect contaminants in the sample bottles. Each field blank will be collected at one of the site sample locations and prepared by filling two VOA vials with CLP-specified grade water at that sample location. Field blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. The field blanks will be analyzed for VOAs. Results of field blank analyses will be maintained with the corresponding sample analytical data in the project file.

One field blank will accompany each ice chest containing samples collected for VOA analyses. Samples for VOA analysis will be shipped together as practicable.

FIELD DUPLICATES

For samples collected for laboratory analysis, field duplicates will be collected at a rate of 10 percent of the total number of samples collected during each day of sampling for each sample matrix type at every site. The number of samples collected will be rounded up to the next increment of ten, such that twenty-one samples would require collection of three duplicates, if collected within three days. At least one field duplicate will be collected per day of sampling and will be packaged and sent to the laboratory for analysis with the other samples of the same sample matrix type.

EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples will be collected to establish that proper sample bottle preparation, decontamination and handling techniques have been employed. Dedicated sample equipment will be used at each site for each sample station. All sample equipment will be decontaminated in the field and carefully packaged for return to the TNRCC Central Office. The decontaminated equipment will be taken to the TNRCC Region 11 Austin Office laboratory where one equipment blank will be collected and shipped to the assigned CLP laboratory for analysis. The equipment rinsate sample will be prepared by collecting CLP-specified grade water from the final rinse of the sampling equipment. Finally, the sample equipment will be placed in individual dated plastic bags, including chain-of-custody seals.

If sample equipment must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and a rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater, and shipped to the assigned CLP laboratory with the associated sample matrix type. The number and type of QA samples at each site will be estimated in the SSI work plan. Modifications to the plan may be deemed necessary by the site investigation manager depending on field conditions, the on-site determination of additions or removals of sample locations, and the number of days required to complete the site sampling investigation.

(B7) CALIBRATION PROCEDURES AND FREQUENCY

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations also may be performed at the start and completion of each test run. However, such calibrations will be re-initiated after any delay caused by meals, work shift change, or damage incurred. Calibration standards used as reference standards will be traceable to the NIST, when existent. Standards will be used and duplicate samples analyzed in the field to verify pH and specific conductance data.

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the EPA-CLP specifications. Calibration of laboratory equipment will be based on approved written procedures. It is the responsibility of the EPA data validators to ensure that the proper calibration protocols specified in the CLP statement of work were used. These calibration procedures and frequencies are included in the EPA Contract Laboratory Program, "Statement of Work for Organic Analysis" including revisions through August, 1994 and in the EPA Contract Laboratory Program, "Statement of Work for Inorganic Analysis" including revisions through February, 1994.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities in accordance with EPA-CLP requirements. Calibration records of assigned laboratories will be filed and maintained at the laboratory location where the work is performed and will be subject to QA audit.

(B6 and B8) INSTRUMENT/EQUIPMENT TESTING, INSPECTION, PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedures developed by the operators.

SCHEDULES

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based on experience and previous use of the equipment.

RECORDS

Logs will be established to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced will be reviewed, maintained, and filed by the operator when equipment, instruments, tools, and gauges are used at the sites. The Program QA/QC Officer will audit these records to verify complete adherence to these procedures.

SECTION 3

ASSESSMENT/OVERSIGHT

(C1) ASSESSMENT AND RESPONSE

QA audits are performed by the Program QA/QC Officer. Functioning as an independent agent, the Program QA/QC Officer will plan, schedule, and approve system and process audits according to company procedure, customized to specific project requirements. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, activities, and documentation of the measurement system(s), including subcontractor activities.

The Program QA/QC Officer will report directly to the Technical Director. The Program QA/QC Officer will coordinate and monitor the overall QA program, including all on-site activities and the quality control programs of the laboratories. Implementing prompt, effective, and accurate corrective action in response to noncompliance that may occur on projects is absolutely essential in assuring the quality of the end product.

QUALITY SYSTEM AUDIT

A quality system audit refers to a detailed evaluation of the Project's Quality Assurance Program to determine its conformance to the Multi-Site Cooperative Agreement commitments and standard TNRCC procedures. Such an audit includes preparation of formal plans and a checklist based on established requirements. A copy of a field audit checklist is at the end of this section. Audits may be performed on TNRCC and subcontractor work.

(C2) REPORTS TO MANAGEMENT

Audit reports will be written by the Program QA/QC Officer after gathering and evaluating all available data. Items, activities, and documents determined by the Program QA/QC Officer to be non-compliant will be identified at interviews conducted with the involved management. Non-compliant elements will be logged, documented, and controlled through audit findings, which are attached to the audit report. These audit findings are directed to the Program Manager to resolve the noncompliance satisfactorily in a specified and timely manner.

All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the Program QA/QC Officer prior to issue. QA verification of acceptable resolutions may be determined by re-audit for documented surveillance of the item or activity. Upon verification acceptance, the Program QA/QC Officer will close out the audit report and findings.

It is the Program Manager's overall responsibility to ensure that all corrective actions to resolve audit findings are acted upon promptly and satisfactorily by project personnel.

FIELD AUDIT CHECKLIST

Project No. _____

Project Name _____

Site Investigation Manager _____

Auditor _____

Dates of Field Audit _/__/__ - _/__/__

1. The Site-Specific Health and Safety Plan has been prepared by the TNRCC Site Investigation Manager and subsequently approved by the TNRCC Program Manager and TNRCC Health and Safety Officer prior to arrival to the site.

Yes ___ No ___

Comments_____

_____

2. The Site-Specific Health and Safety Plan has been signed by all who intend to enter within the site boundaries prior to entry onto the site.

Passed ___ Failed ___

Comments_____

_____

o Project organization:

1. Did the Site Investigation Manager hold a briefing with each participant to go over any concerns or questions for project organization; and

2. Did the Site Investigation Manager provide appropriate number and types of material supplies necessary to collect samples (jars, bottles, gloves, pens, coolers, coolant, preservatives, protective gear, Work Plan, Health and Safety Plan, CLP, QAPP or other reference material)?

Adequate ___ Marginal ___ Failed ___

Comments_____

_____

3. Were additional instructions given to each participant not otherwise found in the preliminary written material, such as the Site-Specific Work Plan, Health and Safety Plan, CLP or QAPP?

Not Applicable ___

Additional Instructions_____

_____

o Samples collection procedures:

1a. The Site Investigation Manager ensured that the sampler collected adequate volumes of sample to allow for the planned sample analyses and field duplicates, plus any laboratory QC blanks and laboratory QC duplicates/spikes, as applicable; and

1b. The Site Investigation Manager provided a supply of the appropriate type of sample containers for the samples collected.

No Modifications ___ Modifications ___ Failed ___

Comments_____

_____

2. Were samples collected as stated in the Site-Specific Work Plan (number, frequency, and type)?

No Modifications ___ Modifications ___

Sample Modifications_____

_____

o Chain of Custody:

1a. The Site Investigation Manager ensured that the sample tags were properly completed and attached to each sample container;

1b. The Site Investigation Manager ensured that the custody seals were properly completed and attached to each sample container in unbroken condition; and

1c. The Site Investigation Manager ensured that each sample container was labeled with the sample number and protected with clear tape.

Passed ___ Failed ___

Comments_____

_____

2. Each traffic report has been completed, faxed to EPA, original copy mailed to EPA, and copies corrected as necessary.

Passed ___ Failed ___

Comments_____

_____

3. The traffic report accompanied each shipment to the correct EPA contract lab.

Passed ___ Failed ___

Comments_____

_____

4. Field observations are written in ink and are presented accurately in the field logbook, and each page is signed and dated.

Passed ___ Failed ___

Comments_____

_____

5. Photographs are logged in the logbook with the date, time, location, name of person taking the picture, type of sample, sample number, and the photo number.

Yes ___ No ___

Comments_____

_____

6. Prior to use, the Site Investigation Manager ensured that the measuring equipment was calibrated to standard procedures as presented in accompanied documents written specifically for the instrument.

Passed ___ Failed ___

Comments_____

7. Have any accountable documents been lost?

Not Applicable ___

Documents Lost_____

_____

General Comments or Concerns Regarding the Sampling Procedures, Organization, and Site Investigation Management:

_____

_____

_____

Signature of Auditor _____

SECTION 4

DATA VALIDATION AND USABILITY

(D1 and D2) DATA REVIEW, VALIDATION, VERIFICATION METHODS

FIELD MEASUREMENT DATA

Field measurements will be made by field geologists and engineers, environmental analysts, and technicians. The following standard reporting units will be used during all phases of the project:

- pH will be reported to 0.1 standard units.
- Specific conductance will be reported to two significant figures below 100 umhos per centimeter (umhos/cm) and three significant figures above 100 umhos/cm.
- Temperature will be reported to the nearest 0.5° Celsius (°C).
- Water levels measured in wells will be reported to the nearest 0.01 foot.
- Soil sampling depths will be reported to the nearest 0.5 foot.

Field data will be validated using different procedures.

- Routine checks will be made during the processing of data - for example, looking for errors in identification codes.
- Checks may be made for consistency with parallel data sets (data sets obtained presumably from the same population) - for example, from the same region of the aquifer or volume of soil.

The purpose of these validation checks and tests is to identify outliers, i.e., observations that do not conform to the pattern established by other observations. Outliers may be the result of transcription error or instrumental breakdowns. Outliers may also be manifestations of a greater degree of spatial or temporal variability than expected.

If an outlier is identified, a decision concerning its fate will be rendered. Obvious mistakes in data will be corrected when possible, and the correct value will be inserted. If the correct value cannot be obtained, the data may be excluded. An attempt will be made to explain the existence of the outlier. If no plausible explanation can be found for the outlier, it may be excluded, but a note to that effect will be included in the report. Also, an attempt will be made to determine the effect of the outlier when both included and excluded in the data set.

LABORATORY DATA

The procedures used for calculations and data reduction are specified in each method referenced previously. It will be the responsibility of the laboratory to follow these procedures.

VALIDATION

The laboratory data will be validated by EPA according to the following EPA documents:

- National Functional Guidelines for Organic Data Review (August 1994)
- National Functional Guidelines for Evaluating Inorganics Analyses (February 1994).

REPORTING

The project analytical report from the CLP laboratory will contain data sheets and the results of analysis of QC samples. Analytical reports may also contain the following items:

- Project identification
- Field sample number
- Laboratory sample number
- Sample matrix description
- Date of sample collection
- Analytical method description and reference citation
- Individual parameter results
- Date of analysis (extraction, first run, and subsequent runs)
- Quantitation limits achieved
- Dilution or concentration factors
- Corresponding QC report (including duplicates and spikes).

Matrix interferences on some of the samples, particularly the waste samples, may result in increased detection limits. Matrix interference will be reported as the cause of increased detection limits.

(D3) RECONCILIATION WITH DQO

The following procedures have been established to assure that conditions adverse to quality--malfunctions, deficiencies, deviations, and errors--are promptly investigated, evaluated, and corrected.

INITIATION OF CORRECTIVE ACTION

When a condition adverse to quality is noted at the project site, laboratory, or subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated at a minimum:

- When predetermined acceptance standards--objectives for precision, accuracy, and completeness--are not attained.
- When procedures or data compiled are determined to be faulty.
- When equipment or instrumentation is found faulty.
- When samples and test results cannot be traced with certainty.
- When quality assurance requirements have been violated.
- When designated approvals have been circumvented
- As a result of an audit.

PROCEDURE DESCRIPTION

Project management and staff, including field investigation teams, sample control personnel, and laboratory groups, monitor ongoing work performance in the normal course of daily responsibilities.

Following identification of an adverse condition or quality assurance problem, notification of the deficiency will be made to the project manager and senior individual in charge of the activity found to be deficient, along with recommendations for correction. Following implementation of corrective action, the senior individual in charge will report actions taken and results to the Program Manager and Program QA/QC Officer.

SECTION 5

EQUATIONS FOR PRECISION, ACCURACY, AND COMPLETENESS

Planned procedures used to assess data precision and accuracy are in accordance with 44 FR 69533, "Guidelines Establishing Test Procedures for the Analyses of Pollutants", and appendix III, "Example Quality Assurance and Quality Control Procedures for Organic Priority Pollutants", December 3, 1979. Completeness is recorded by comparing the number of parameters initially analyzed with the number of parameters successfully completed and validated.

PRECISION

Relative percent difference (RPD) is calculated as:

$$RPD = \frac{|x_1 - x_2|}{x} \times 100\%$$

where:
x_1 = analyte concentration of first duplicate
x_2 = analyte concentration of second duplicate
x = average analyte concentration of duplicates 1 and 2.

ACCURACY

Accuracy is expressed as a percent recovery (PR), calculated by:

$$PR = \frac{(A-B)}{C} \times 100\%$$

where:
A = spiked sample result (SSR)
B = sample result (SR)
C = spike added (SA).

COMPLETENESS

The completeness of the data will be determined by:

$$PC = \frac{N_a}{N_t} \times 100\%$$

where:
PC = percent complete
N_a = number of actual valid results
N_t = number of theoretical results obtainable.

APPENDIXD

Site Reconnaissance Checklist

SITE RECONNAISSANCE CHECKLIST

I. General
   1. Name and title of site contact.
   2. Telephone number.
   3. Site address.
   4. Mailing address (if different).
   5. Name of owner and/or operator.
   6. Mailing address.

II. Site History
   1. How long has current owner/operator been at site?
   2. What were previous uses of site? Who were previous owners?
   3. Size of site (acres).
   4. Is any other property used that is not contiguous with site?
   5. Permits (RCRA, TDH, etc.)
   6. Any past spills or other environmental or accident problems.
   7. What were previous waste management practices?

III. Current Operations
   1. What is currently being done at facility?
   2. What are waste management practices?
   3. What are hazardous chemical management practices?
   4. List major hazardous chemicals/constituents present and past.
   5. Discuss sources (e.g., tanks, impoundments, containers, etc.).
   6. Number of employees - current, peak.

IV. Source Characteristics
   1. Identify type of wastes and quantities disposed of at site.
      a. Identify source of information.
      b. Photograph.
      c. Dimension (quantity, volume, area) of waste locations.
      d. Containment controls (clay cap, clay liner, vegetative cover, etc.)
      e. Existing data.
      f. Condition/integrity of storage/disposal units.

Site Reconnaissance Checklist, continued

V. Groundwater Pathway
1. Distance from source to nearest well. Identify name and address of well owner, if possible - and estimate well usage (number of people served, irrigation, supplemental, etc.).
2. Verify wells within range of site. Indicate depth to water for each well and number of people served. Identify as many owners and addresses as practically feasible.
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
3. Aquifer nearest wells are screened in, and water quality.

VI. Surface Water Pathway
1. Identify the TNRCC Basin and Stream Segment where the site is located.
2. Describe surface water quality including:
   a. average discharge,
   b. total basin drainage area,
   c. TNRCC surface water quality monitoring stations.
3. Are there surface water bodies within 2 miles of site?
4. Provide sketch of surface water runoff and flow patterns for 15 stream-miles downstream.
5. identify intakes along surface water route within 15 stream-miles downstream.
6. What is water use at each intake.
7. Identify fisheries along the 15 stream-mile downstream pathway.
8. Identify sensitive environments along the 15 stream-mile downstream pathway (see attached list).
9. Identify downstream recreational uses.
10. Estimate approximate flow rates for each water body within the 15 stream-mile target distance (i.e., <10 cfs, 10-100 cfs, 100-1,000 cfs, 1,000- 10,000 cfs, etc.). Estimate length of each stream segment.
11. Identify the annual rainfall and net rainfall at the site.
12. Is site in flood plain (10 year, 100 year, 500 year)?
13. Estimate upgradient drainage area limits (watershed).
14. Draw a sketch of drainage from site to nearest surface water including any other contributing tributaries.
15. Identify recreational uses downstream (15 miles).

VII. Soil Exposure Pathway
1. Describe status of site access, fencing, gates, locks, condition of security controls.
2. Describe adjacent land use.
3. Describe off-site runoff patterns.

4. Describe number of people with residence, school, or day care on-site or within 200 yds.
5. Locate nearest school or day care.
6. Number of workers on-site (include maximum number to cover work on-site).
7. Evidence of recent human activity at the site.
8. Identify sensitive environments, (see list end of checklist).
9. Describe any off-site runoff pattern existing at the site.

VIII. Air Pathway

1. Estimate number of people within 4 miles (city or county records).
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
2. Shortest distance from source to occupied building.
3. Identify known releases to air.
4. Identify reports of adverse health effects.
5. Identify existence of sensitive environments within 4 miles (see end of checklist for list).

Miscellaneous Inquiries

1. Are any additional aerial photographs depicting site history available?
2. Meteorological data.
3. Nearest recreational area? Hospital?
4. Local water supply sources?

Site Sketches to Include

1. Date(s) of visit.
2. Well locations (including nearest to site).
3. Storage areas (past and present).
4. UST and above ground storage tanks.
5. Waste Areas.
6. Buildings
7. Access roads.
8. Areas of ponded water, or depressions in surface.
9. Drainage direction.
10. Photograph locations and directions.
11. Vegetation and significant landscaped features.
12. Any irregular appearance for soil, vegetation, tanks, etc. such as may result from spill, backfill operation, recent dirt moving work, etc.